Volume XIV
Number 6.

JUNE, 1898.

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Page 56. 2-3 1905*
April 11, 98.

TEXTILE WORLD.

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INDUSTRIAL RECORD

The Textile World's Complete Directory of the Mill Trade and of Large Buyers of Textile Fabrics, for 1898, is now ready for delivery. It contains 400 pages, and 19 textile maps; several valuable new features have been added.

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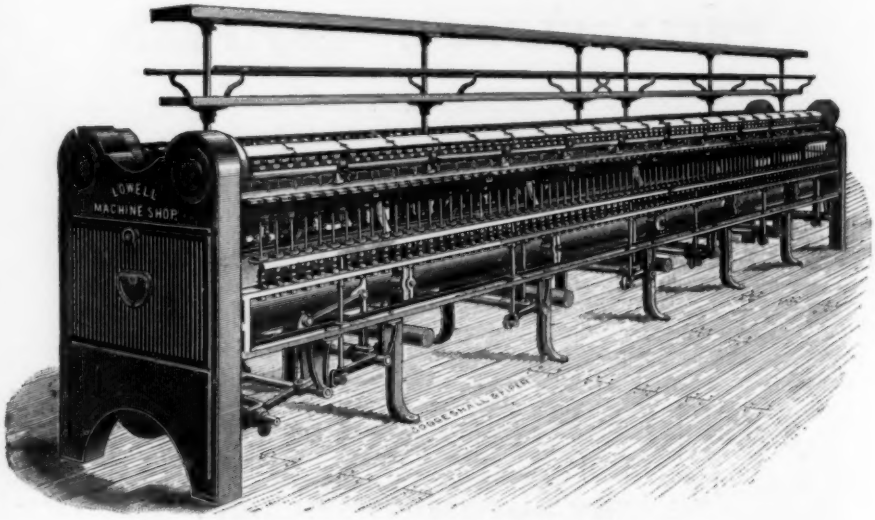

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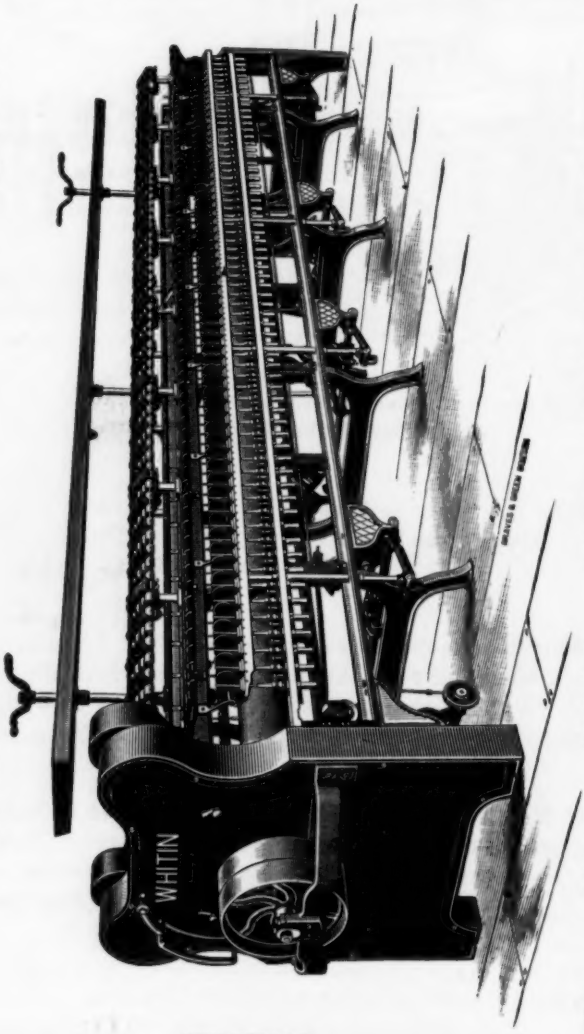

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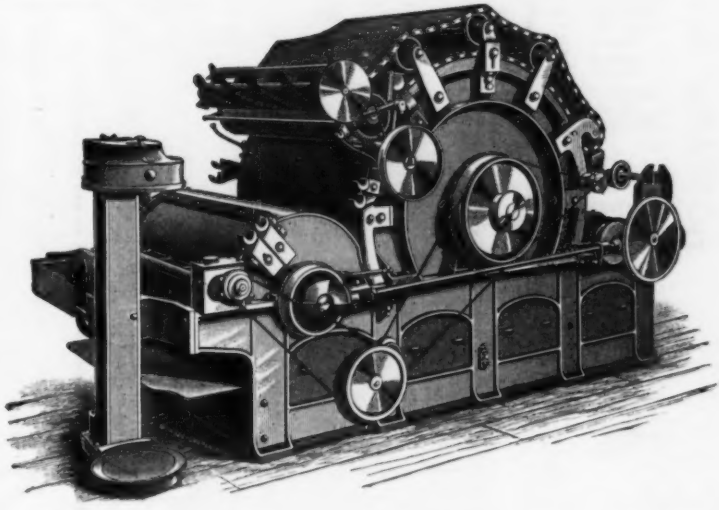

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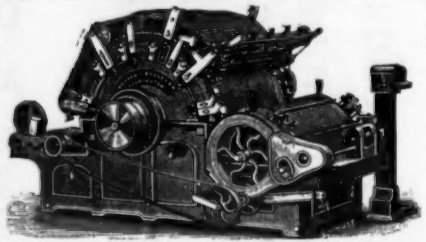

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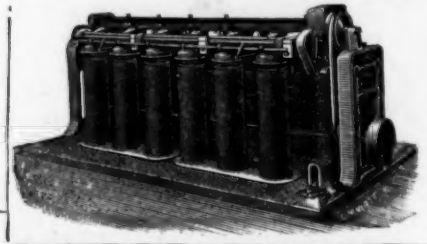

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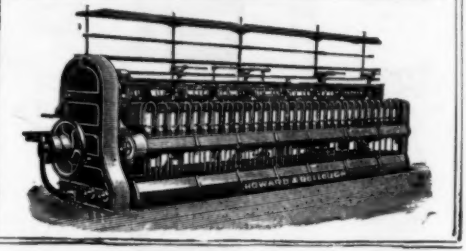

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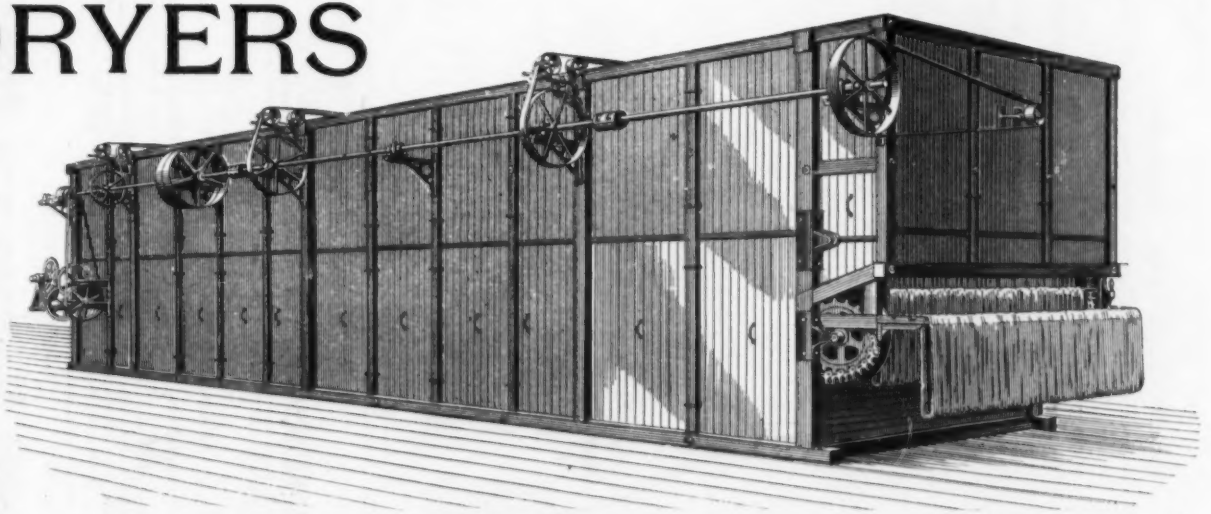

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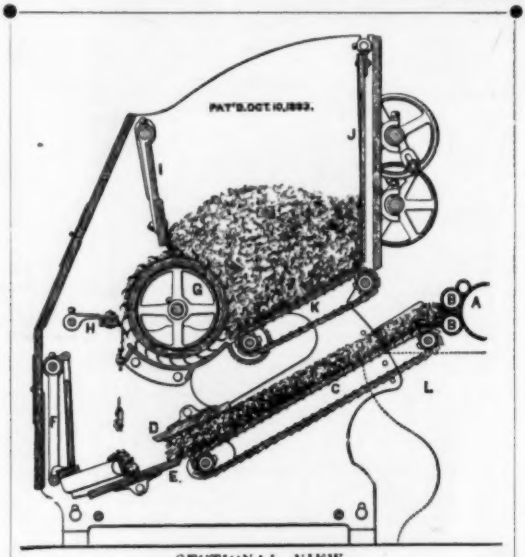

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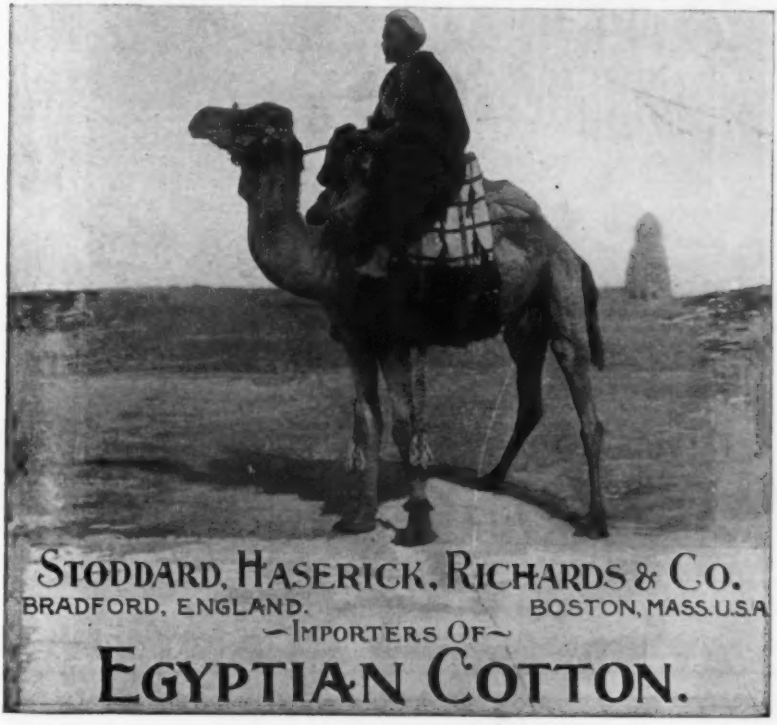

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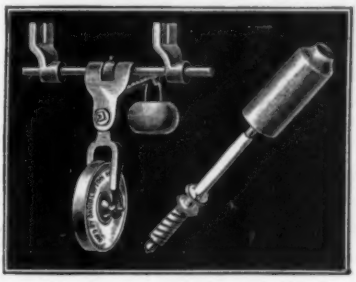

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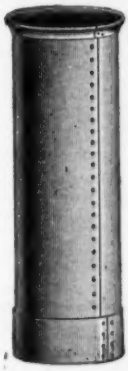

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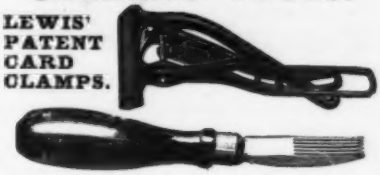

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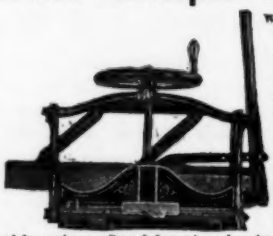

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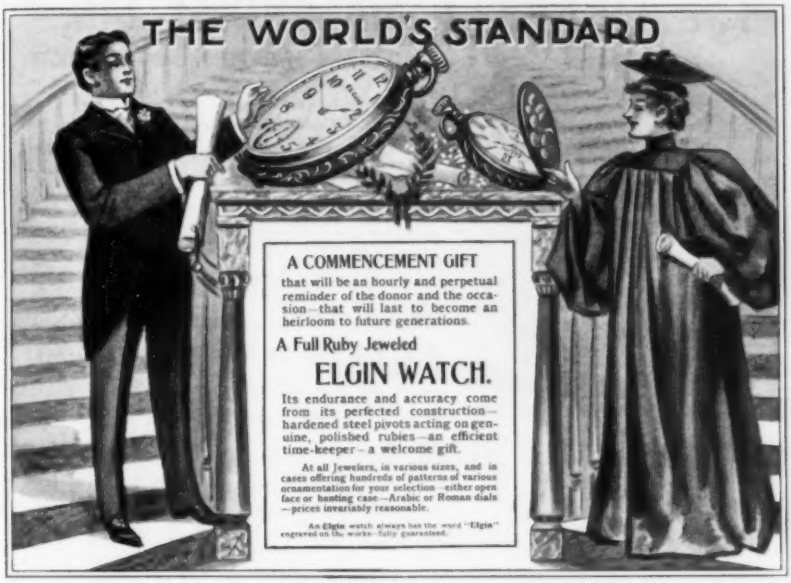
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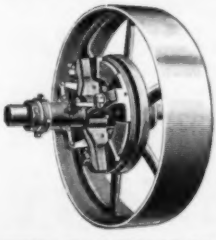

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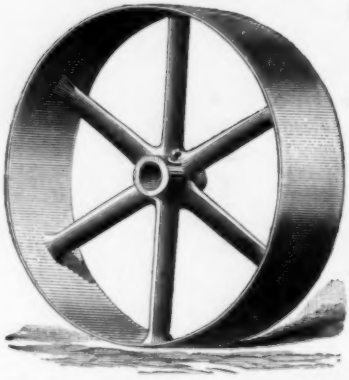

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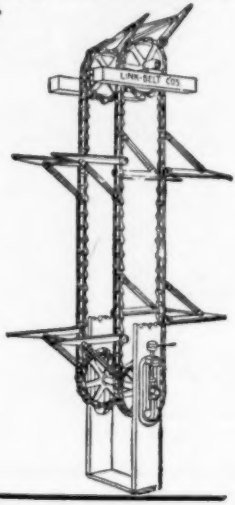

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PATENTS

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George W. Gregory, in November, 1874, resigned his position as Principal Examiner U. Patent Office to enter the firm.

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Mr. George W. Gregory, of Crosby and Gregory, has taken out for us since January, 1875, more than two hundred patents. GEO. DRAPER & SONS.

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PHILLIPS & ANDERSON,

Attorneys-at-Law and Solicitors in Patent Causes,

Exchange Bldg., 53 State St., Boston, Mass.

Mr. Van Everen, of our office, was for a number of years an Examiner in the U. S. Patent Office, in the Division of Textiles.

List of Textile Patents.

Issued April 19 and 26, and May 3, 10 and 17, 1898.

Specifications and drawings furnished for ten cents each Address W. S. Gavey, P. O. Box 222, Brooklyn, N. Y.

Alizarine Derivative. Dark Green. 603,659. R. E Schmidt, Elberfeld, Germany, assignor to the Farbenfabriken of Elberfeld Co., New York, N. Y.

Baling Cotton. 603,250. Charles L. Bessonette, Waco, Texas.

Carding-Machine Clearer Roll. 603,044. E. E. Orrell, assignor to Whitin Machine Works, Incorp., Whitinsville, Mass.

Cellulose for Manufacturing Spun Fabrics. Apparatus for Preparing. 603,333. Carl Kellner, Vienna, Austria-Hungary.

Cotton-Thinner. 603,271. R. J. Gatling, New York, N. Y.

Cotton Collecting Apparatus. 603,697. C. J. Luce, Niantic, Conn,

Cotton Press. 603,784. Frank L. Dyer, Washington, D. C., assignor to the American Cotton Co., New York, N. Y.

Carpet Fabric Cut-Pile. 604,320. H. Hardwick, Philadelphia, Pa.

Cloth-Clamp for Textile Machinery. 604,103. R. P. Winsor, Auburn, R. I.

Cotton-Handling Machine. Pneumatic. 604,037. J. T. Fuller, Calvert, Texas.

Cotton Press. 604,012. Wm. E. Anderson, Little Rock, Ark., assignor to the Standard Circular Cotton Co., Ltd., Liverpool, Eng.

Cotton Press. 604,028. Frank L. Dyer, Washington, D. C., assignor to the American Cotton Co., New York, N. Y.

Cotton Press. 604,029. Frank L. Dyer, Orange, N. J., assignor to the American Cotton Co., New York, N. Y.

Dye. Basic Red Disazo. 602,637. E. Konig, assignor to Farbwerke, vormals Meister, Lucius & Bruning, Hochst-on the-Main, Germany.

Dye. Basic Yellow Disazo. 602,638. E. Konig, assignor to Farbwerke vormals Meister, Lucius & Bruning, Hochst-on-the-Main, Germany.

Dye. Green Trisazo. 603,645. K. Krekeler and E. Martz, Elberfeld, Germany, assignors to Farbenfabriken of Elberfeld Co., New York, N. Y.

Dye. Green Trisazo. 603,647. K. Krekeler, E. Martz and A. Israel, Elberfeld, Germany, assignors to Farbenfabriken of Elberfeld Co., New York, N. Y.

Dyeing Apparatus 603,915. Alexander F. Melrose and H. B. Van Deusen, Pittsfield, Mass.

Dye. Blue Azin. 602,544. P. Ott and T. Kroeber, Elberfeld, Germany, assignors to Farbenfabriken of Elberfeld Co., New York, N. Y.

Dye. Brown Disazo. 602,641. E. Konig, assignor to Farbwerke, vormals, Meister Lucius & Bruning, Hochst-on-the Main, Germany.

Dye. Coppery Brown. 602,639. E. Konig, assignor to Farbwerke, vormals, Meister Lucius & Bruning, Hochst-on-the-Main, Germany.

Dye, Red-Violet Basic Disazo. 602,640. E. Konig, assignor to Farbwerke, vormals, Meister Lucius & Bruning, Hochst on-the Main, Germany.

Dye. Violet. 602,540. M. Kahn, Elber-

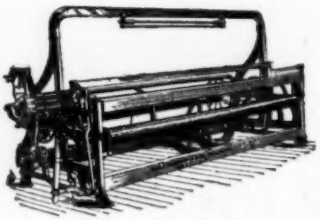
(Continued on next page.)

Holland and Colonies.

Patents. Trade Marks.

H. Massink, L. D. at Amsterdam.

M. A. FURBUSH & SON MACHINE CO.



Blanket Loom, No. 128.

A WORD ABOUT LOOMS.

We have been loom builders for nearly 50 years. The name of Furbush is closely associated with the developement of the woolen loom in this country, and in the carpet trade our Murkland loom is used wherever the ingrain carpet is made. We also make a specialty of looms for rugs.

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Our pattern No. 128 is a strong, substantial loom of best material, and adapted, with modifications, to weave blankets, table covers, paper makers' felt and heavy cloth.

Our standard widths are 49, 92, 100 and 115 inches, reed space.

Particulars of a loom 115 inches in the reed space: Revolutions to pick, 2; picks per minute, 80; h. p., 1; floor space, 15x5 feet; weight, 2,300 pounds.

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224 MARKET STREET, PHILADELPHIA.

feld, Germany, assignor to Farbenfabriken of Elberfeld Co., New York.

Dye. Brown Sulfur. 603,755. R. Demuth, assignor to Farbenfabriken of Elberfeld Co., New York, N. Y.

Dye. Brown Trisazo. 603,648. K. Krekeler, E. Martz and A. Israel, Elberfeld, Germany, assignors to Farbenfabriken of Elberfeld Co., New York, N. Y.

Dye. Gray Trisazo. 603,646. K. Krekeler, E. Martz and A. Israel, Elberfeld, Germany, assignors to Farbenfabriken of Elberfeld Co., New York, N. Y.

Fabrics or Permeable Materials with Nitrocellulose Compounds and Product Produced Thereby. Coating, 602,797. F. G. Annison, assignor to Publishing, Advertising and Trading Syndicate., Limited, London, Eng.

(Continued on page 126.)

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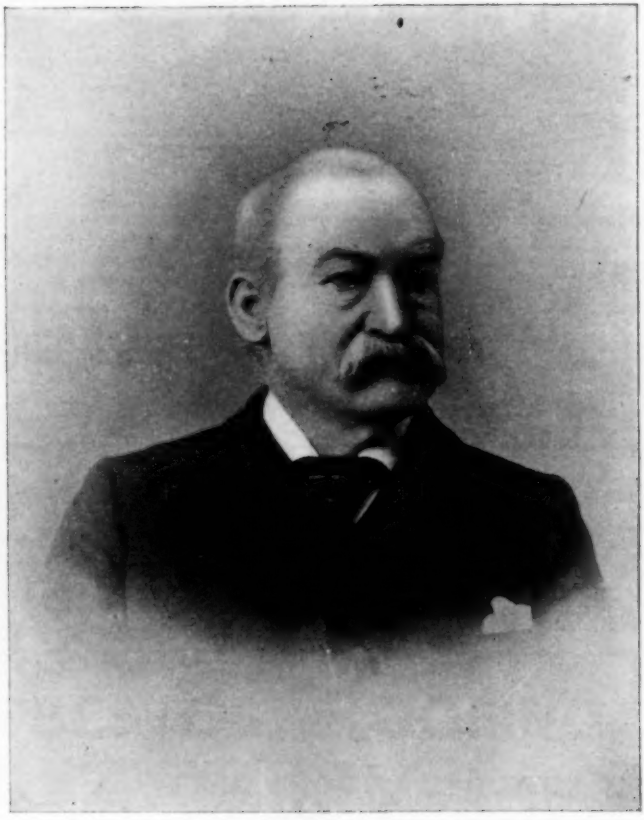

JOHN L. HOUSTON.

TEXTILE WORLD.

Vol. XIV. JUNE, 1898. No. 6.

JOHN L. HOUSTON.

John L. Houston, well known throughout the United States as the president of the Hartford Carpet Mills, Thompsonville, Conn., died at that place April 15, 1898, at the age of sixty-five. He came of strong Scotch ancestry. His father and mother were among the first who settled in that thriving manufacturing village.

His father was thoroughly educated in his business, and a master of the art of dyeing as it then existed. He was employed by the carpet manufacturing company at Thompsonville soon after his settlement there, and greatly raised the reputation of its products, both for the beauty and permanence of their colors.

John L. Houston's early education was obtained in the public and private schools, and in the office and extensive works of the Thompsonville Carpet Co., having entered the employ of the latter at the age of fourteen. After the failure of this company, in 1851, he went to Scotland, and on his return taught school, then studied law for a few months, when he entered into partnership with Governor Buckingham for a short period, in the manufacture of carpets, in Norwich, Conn. In 1854, the old Thompsonville Mills were re-opened under the name of The Hartford Carpet Company, with Mr. Houston as assistant superintendent, which position he held until 1860, when he became superintendent, and in 1878 was chosen president and treasurer. When he became superintendent, in 1860, the company was making about 4,000 yards of carpet per day. In the course of eight years, he doubled this production. After the introduction of the Brussels and Moquette looms, the business was still further enlarged and the product diversified. His duties involved a number of voyages to Europe to investigate improvements in machinery and material.

Mr. Houston was four times elected to the Connecticut House of Representatives and twice to the Senate. He made a number of speeches while in the General Assembly, which attracted special attention; that favoring the location of the capitol at Hartford, and the repeal of the usury law, were considered very able, particularly the latter, which was considered the best he ever made.

Mr. Houston was a great reader, constantly storing up information which was held ready for instant use by a tenacious memory. He had travelled much and his observant eyes were every moment busy. He had the soundest judgment, courage of his convictions, vigorous strength and endurance of mind and body, great tact and good command of language. He had that faculty which enabled him to always select the appropriate words required. He was a powerful debater and a fluent and easy public speaker, always fervent and often eloquent. His great tact enabled him to avoid even the appearance of obstinacy without yielding a cherished opinion. These qualities made him a valuable and, of course, influential member of any body, committee, community or social circle of which he was a member.

Mr. Houston was a born leader of men. He understood human nature, but was never known to appeal to any low motive to influence men. Of in-

corruptible integrity himself, he would never ask or require another to yield a principle.

Mr. Houston, before his whole time was so entirely concentrated in his work, found some time for recreation, and his home was a place where friends often gathered for a few merry hours. He was very hospitable and enjoyed company. He was fond of music and lively conversation. He enjoyed a time in which wit, humor and anecdote bore a part, and he could take part as well as an actor as a listener. He could relate what he had observed or picture a scene in which he had borne a part vividly, and bring out the humor of the situation in a masterly way. He loved good books and had good literary taste, and in every unemployed hour, perhaps it might almost be said unemployed minute, he was reading. He had a set of Shakespeare in twelve small volumes, and when he travelled one of these was always with him. Familiar as it had all become to him, he still loved to read it by snatches over and over.

Mr. Houston was for many years one of the excutive committee of the National Association of Wool Manufactures, and for several years its senior vice-president. He was also for many years, a director in the National Fire Insurance Company of Hartford, the Holyoke Water Power Company of Holyoke, the Thompsonville Trust Company, the Suffield and Thompsonville Bridge Company and other local enterprises.

He was married in 1855 to Harriet Jane Upson, Westfield, Mass., who survives him, together with four children.

—It appears that some of those interested in cotton and its manufacture in the South, among them J. F. Hanson, of Macon, Ga., are trying to bring pressure upon Congress to incorporate in the revenue bill, or some other measure, a duty on Egyptian cotton. Quite a delegation presented themselves at Washington not long since, with this object in view, according to our esteemed contemporary the "Atlantic Constitution." The probabilities are that nothing will be accomplished in this direction.

Coating Fabrics With Nitro Cellulose.

A patent has just been granted for improvements in the art of coating fabrics or permeable materials with nitro cellulose compounds.

This new product consists of a cloth, felt, leather, or similar flexible permeable base having united to it in a novel manner a waterproof surface of a durable, flexible, tough, and elastic character composed of nitro-cellulose compound intimately combined with or united to the base. The product may be applied to a variety of uses in the arts where permanent waterproof surfaces are desired. The invention is specially advantageous in the production of ornamental surfaces either in plain or embossed effects, which are produced in a variety of designs and colors and applied to various uses in the arts—for instance, as wall decorations, for upholstering, floor-covers, and as imitation grain and other leathers, &c. In practicing, fluid solution is used, of nitrocellulose dissolved in camphor, or its equivalent, and spirit—such as grain-alcohol, wood-alcohol, or methylated spirit, or their equivalents.

—The best tops are produced from the greasy Colonial wools; but when prices are low, there is a general tendency, where it is possible, to introduce some of the cheaper varieties—such, for instance, as the Buenos Ayres and Monte Vidian wools—in order to meet the market.

—It is not to be wondered at that in the early days of Lucca's activity Saracenic designs were adopted; for we know that Italy was impregnated with Mahommedan ideas, and that "to them is due the origin and development of most of the greatest textile designs of Italy, Spain, and Germany, which culminated at the period of the Renaissance."

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WITH WHICH IS INCORPORATED THE

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THE AMERICAN TEXTILE, THE DESIGNER AND WEAVER, WARP AND WEFT, THE WOOLEN MANUFACTURER

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BOSTON TEXTILE.

An Illustrated Monthly Magazine representing the Textile Industries of the United States.

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Proprietors and Publishers.

HENRY G. KITTREDGE, Editor.

PUBLICATION AND HEAD OFFICES:

BOSTON: - 620 ATLANTIC AVE.

PHILADELPHIA OFFICE,
THE BOURSE.

NEW YORK OFFICE,
140 Nassau Street.

Subscription Price.

$2.00 per year for U. S. and Canada.
2.50 per year for Foreign Countries.
3.00 per year with Dyer's Supplement.
(Postage is prepaid by publisher.)

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THE TEXTILE WORLD'S COMPLETE DIRECTORY OF THE TRADE.

(400 pages with 19 maps)

Containing full information about all

COTTON MILLS, WOOLEN MILLS, KNITTING MILLS, SILK MILLS, DYE WORKS, PRINT WORKS, BLEACHERIES,

also lists of

Dry Goods Commission Merchants,
Dealers in Raw Materials,
Manufacturing Clothiers,
Suit and Cloak Makers,
Jobbers and Large Retailers,
Buyers from First Hands.

Special quarterly issues are published in January, April, July and October; one (January) being a statistical issue, and the others devoted especially to the cotton, knitting and woolen branches, respectively.

THE 1898 DIRECTORY.

The Textile World's Annual Directory of the Mill Trade and of large Buyers of Textile Fabrics in the United States for 1898 has been issued and is now being delivered as speedily as possible to those entitled to receive it. It is a book of 400 pages with 19 map plates. The work of delivery takes some time, but is proceeding as rapidly as possible.

There has never yet been a year since we undertook the publication of the Directory, first in sectional form and later in one complete volume, when some new features have not been added. It was the Textile World which first conceived the idea of publishing, in 1894, the textile maps showing the location of cities and towns. In the 1898 edition, these maps have been revised up to date.

We have also added several new features, among them being a separate list of mills operating worsted machinery. No other directory has ever contained this feature, which we feel sure will be appreciated by many who have hitherto been obliged to search through the entire Directory to pick out such mills. We have also added a list of wool scouring establishments that do work for the market and on commission. In response to numerous requests, we are publishing for the first time a list of wholesale rag dealers who do business with textile interests.

It may be of interest to know that more than 80 per cent. of the mills reported some change from last year's statistics. Several hundred new mills have been added, scores have been taken out, and the data completely revised by thousands of changes, so that last year's Directory is almost as obsolete as a year-old almanac.

The compilation and revision of the Directory is a task of great magnitude, infinite care and detail, which can hardly be appreciated by those who never had experience in such matters. It necessarily requires some months' time and, during the process,

there are of course numerous changes taking place. We have endeavored to keep track of these as far as possible by a new department entitled "Too Late for Classification," in which are included additions and changes up to late date.

This Directory is published for the subscribers to the Textile World and the mill trade generally. It has been a pleasure for us to receive suggestions from time to time as to how the Directory could be improved in its present features or by new ones. We are always glad to hear from any one in regard to such matters and, although we cannot promise always to adopt their suggestions, we can assure them of most careful consideration. There are undoubtedly very many facts which might be published which would interest a certain number of subscribers in relation to class of machinery, etc., but it must be borne in mind that it is the publishers' duty to consider the interest of the greatest number and, from a commercial standpoint, the size of the book must also be kept within reasonable limits, for when it is considered that this Directory is presented to the subscribers to the Textile World the question of keeping cost within bounds can be appreciated.

Last year we were encouraged by the hundreds of letters from advertisers and subscribers commending the book, and we sincerely hope that our friends may find the 1898 edition maintains the same high standard of excellency. It is our modest opinion that this Directory surpasses any ever published in point of accuracy, completeness of contents and convenience of arrangement, regardless of price

We take this occasion to thank the manufacturers and others whose cooperation has made this possible.

SPANISH-AMERICAN WAR.

The war between the United States and Spain has now been in progress for a little over seven weeks, and there are a number of political problems that have unexpectedly presented themselves which our government will have to deal with in the future, that may change very materially our policy in relation to foreign nations and to our own commercial development. We are on the eve of a new era in our political history, and the solution of contingent phases of a new existence will occupy the best thoughts of our ablest statesmen for a number of years to come, in order to harmonize novel conditions affecting our constitutional limitations and the needs of our commercial life. It is very evident that this war will end with this country in possession of territory that was little anticipated or planned for. We entered upon the contest with the chief intention and avowed purpose of liberating Cuba from Spanish misrule, and establishing for that island an independent government, according to the will of its most intelligent inhabitants. How vital a factor the insurgent government and military forces will be in the formation of this government is very uncertain, as nothing yet has been developed to show that the power of the insurgents represents the true sentiment of the better classes of the people.

The taking of Manila has brought into prominence questions which we scarcely realized would arise for our consideration at the time our government declared war against Spain. There came to our naval forces, in less than ten days after the declaration of war, a victory that is unequalled, in many important respects, in the history of the world within the last three centuries, and which placed us in possession of territory that we may be constrained to retain whatever our individual wishes may be, due to the jealousies of foreign nations, as it is clear that we can never return to Spain what we have taken from her.

We have got the Philippine Islands on our hands to govern, for how long a time it is impossible to say, and how to govern the islands and their people is certain to give us serious thought, in order to reconcile the status, not

only to our past policy, but to our national constitution We have no precedent to guide us, as our governmental institutions were not framed upon any idea of colonial possessions. We are simply accidentally in control of foreign territory seven thousand miles from our shores. We found, however, during our own civil war, and upon other occasions, that the constitution of the United States is sufficiently elastic in its provisions to permit Congress of interpreting it to our advantage, and according to the circumstances under which the country may be placed. The constitution provides that "Congress shall have power to dispose of and make all needful rules and regulations respecting the territory or other property belonging to the United States." Congress has always acted upon the theory that newly acquired territory is not necessarily subject to the specific laws of the United States, except as they are made applicable by special legislation. Examples of this may be instanced in the cases of Texas and Alaska, and especially the later, which we received as an unorganized territory, and only such laws were made applicable as were considered suitable to the necessities of our new acquisition. This theory has been upheld by our courts. If this is a true rendering of the letter and spirit of our constitution, it would seem that little may be feared of our becoming hampered by any existing statutes for the government of any Spanish possession that may fall into our hands. Whatever may have been the views of the people and our legislators concerning the desirability of acquiring Hawaii, events seem to be hastening us to the absolute necessity of annexing them to the United States, if for no other purpose than for the use of our navy and commerce. This will become doubly imperative should we hold a coaling station or any possession in Asiatic waters.

Territorial possessions within Asiatic influences may eventually force us into taking part in the events involved in the Eastern question and the development of trade with Asiatic countries, in line with the open-trade policy of Great Britian. Should this come about, it will naturally lead to an alliance, for commercial purposes, at least, with England, as our sympathies are wholly with the latter, in contradistinction to the restrictive policy of Russia and Germany. But, while we may feel the importance of an alliance of this kind in the interest of commerce and a high civilization among all people, we believe our government should be extremely cautious in not implicating this country in any compact by which our army and navy may be brought into use, or our foreign policy changed which may embroil us in the colonial contests of European powers. In other words, any alliance with foreign countries should be limited simply to a moral support of that which will promote the peaceful pursuits of commerce and the elevation of mankind.

In looking at current events in some of their phases, the war will be worth what it costs if it brings more closely together the English-speaking people of the world, in ameliorating the conditions of mankind and in advancing the nobler pursuits of commerce. The people of England and America, notwithstanding the infusion of other bloods, are one in blood, speech, laws, literature, thought, traditions and interests. All these we have in common, and we are one in all things that tend toward elevating and improving the manner of living and methods of intercourse between men. Our apparent destiny is the same. It is due to this common lineage and inspiration that have drawn the English speaking people so closely together during our contest with Spain, and which has actuated Great Britian to discountenance and obstruct the hostile machinations of European powers toward the United States in favor of the Spanish monarchy. When the secret history of this war is written and the part taken in it by foreign powers, we shall find that we are indebted to the influences of Great Britian more than we

now fully realize, in the moral attitude of that country in support of our contentions with Spain. Richard Olney, Secretary of State under the last adminstration, truly said, in the concluding portion of an address recently delivered by him, that "there is a patriotism of race as well as of country—and the Anglo-American is as little likely to be indifferent to the one as to the other. Family quarrels there have been heretofore and doubtless will be again, and the two peoples, at the safe distance which the broad Atlantic interposes, take with each other liberties of speech which only the fondest and dearest relatives indulge in. Nevertheless, that they would be found standing together against any alien foe by whom either was menaced with destruction or irreparable calamity, it is not permissible to doubt." The English speaking people have unquestionably a common mission to perform.

A vital question presents itself to our consideration affecting our ability to stand the strain of war. Whatever debt we may incur, we shall receive some offset in the way of indemity from Spain, insured by territorial possessions and the revenue that may be obtained from these and other sources, though these revenues may be insufficient to meet the demands of a local government and leave a balance to pay off our claims till the lapse of many years. Whatever we get from Spain, we must take from her colonial possessions, as we can expect nothing from the mother country. But, even if we were obliged to bear the whole expense of the war ourselves, there is no reason why we should be disturbed, particularly, about it. Our natural resources are immense, and far from being fully developed. We are the most favored industrial nation in the world. The value of the mineral products of the United States, in 1880, was $369,000,000, and the value of our manufactures, $2,800,000,000 against $587,000,000 and $6,500,000,000, respectively, in 1890. Our progress in these respects alone are sufficient to enable us to bear a large increase in our war debt.

To give some idea of the material progress of the wealth of the United States, we will note that the valuation of real and personal property in 1870, at a time when our civil war debt was about the heaviest, was $17,000,000,000; and 1890 it rose to $65,000,000,000. At the present time it is estimated at $82,000,000,000, and there is every reason to expect that it will amount to $130,000,000,000 in 1915, when we shall probably be called upon to begin the payment of bonds that may be issued to carry on the present war. Our national debt at the present time is about .012 per cent. of the valuation of real and personal property in the United States, and, on this per centage, we could carry a debt in 1915 of $1,560,000,000. We present herewith a table of interesting statistics taken from the censuses of 1860, 1870, and 1890, and the official statistics for 1897, showing the population, etc. of the country at these periods.

With a war expenditure of one mil-

	1860.	1870.	1890.	1897.
Population	31,443,321	38,558,371	62,622,250	73,807,000
Debt—interest and non-interest bearing, Feb. 28, '98				$1,235,668,419
Debt—interest and non-interest bearing, June 30		$2,246,994,068	$890,784,370	$992,022,900
Debt per capita		$56.81	$14.22	$13.63
Interest per capita		$2.83	$0.47	$0.47
Interest on debt		$112,000,000	$29,417,603	$34,387,315
Total commerce (imports and exports)	$687,192,176	$828,730,176	$1,647,139,093	$1,815,723,968
Railroads—miles in operation	30,626	52,922	166,691	183,000
" gross receipts		$500,000,000	$1,100,000,000	$1,200,000,000
" freight rate on wheat from Chicago to N. Y., per hundred, all rail		33.3 cents.	14.31 cents.	12.32 cents.

lion dollars a day, we could carry on the war for three years and four months before accumulating a debt equal to that in 1870, and at a less annual interest. We could carry it on over eight years before the debt amounted per capita to what it was in 1870, even persuming there be no increase in our population. Should we raise, by the issuing of bonds, $400,000,000, we could clear this debt off and pay the interest on it in less than seven years, on the basis of the reduction of the national debt between 1870 and 1890. Comparing these statistics, showing the wealth of this country, with those of other countries, and we find that the wealth of Great Britian is estimated at the present time at $60,000,000,000, against our $82,000,000,000, and that of France and Germany combined at $90,000,000,000. Upon the strength of our wealth, we could meet one-half of Europe in war. Compare this still further, with the wealth of Spain, which is estimated at $12,000,000,000, and we can see what country we are now dealing with, in its ability to stand long continued hostilities.

	United States.	U. Kingdom G. B. & I.	France.	Germany Belgium & Netherlands
Army, support of	$ .67	$2.17	$3 12	.....
Navy, support of and construction	.48	2.71	1.25	.....
Support of Civil Service, public bldgs, &c	1.42	2.94	4.98	.....
Interest and pensions combined in U. S. A. Interest on National debt only in other countries	2.45	3.04	6.23	.....
Total per head	$5.02	$10.86	$15.58	*$10.00

* Estimated.

In order to further show the financial strength of the United States, we give below statistics taken from a recent communication of Edward Atkinson to the New York Journal of Commerce, showing the comparative expenditure for specific purposes, derived from national taxation, per capita, for the year of 1897. From these, the favorable condition of the United States will be seen.

Furthermore, war comes to us at a time when we are especially well able to stand it, as, notwithstanding the depression that characterized our industries in the East, we are, as a whole, on a tide of prosperity, which, apparently, is little affected by the hostilities that are going on outside of the country. In some respects, the war is stimulating some industries and distributing money. The volume of business in this country is on the constant increase, and those sections that are now experiencing an industrial depression must in time feel the stimulating effect of the revival of business in the North West. Railroad earnings show an increase over last year of more than fifteen percent., due largely, no doubt, to the extraordinary movement of breadstuffs. Payments through clearing houses were never so heavy in the history of the country. The key of the situation is clearly in the prosperous condition of the West.

We trust that Congress will appreciate the wisdom of obtaining money for the carrying on of the present war through the sale of bonds of fifteen to twenty years duration, instead of attempting to meet the expenditures by current taxation, more than what is absolutely called for by the immediate necessities and equities of the situation. As we stated above, we could pay off a debt of $400,000,000 within a comparatively short time, and not mind it, only let us grow to it. This view of the situation pervaded a recent speech of the Hon. Charles A. Russell, in the House of Representatives, in which he said: "It seems to me that in devising ways and means to provide the necessary money to carry on the war, there is in this loan pro-

position a clear, positive, profitable business principle in the authorization of a loan instead of the authorizing of the issue of greenbacks or any other form of paper currency."

Incidentally, it may be of interest to allude to certain statistics that were brought out by Mr. Russell, showing that the aggregate of the expenditures growing out of the civil war, covering the period from July 1, 1861 to June 30, 1879, amounted to $6,189,000,000.

Again referring to the communication of Edward Atkinson, we find therein a digest of the revenues and expenditures of the United States for twenty years (1878 to 1897, inclusive), showing that with the comparatively small excess of revenue over expenditures for that period of only 84 cents per capita, year by year, a billion dollars were collected for the reduction of the national debt. With all of these statistical evidences before us, of the prosperity of the country, with its immense resources, there is no reason why we should distress ourselves with the thought that the present war with Spain will have any disturbing effects of long continuance upon our business enterprises.

WOOL AND MUTTON.

The apparent facts are impressing themselves upon manufacturers in this country and abroad that there is danger of an early deficiency in the supply of fine, or merino, wools, to meet the necessary demand of trade. There are various causes at work that have a tendency towards this condition; among them may be mentioned the encroachment of more enlightened industries,—such as agriculture and manufactures, which usurp the valuable grazing lands of countries where sheep husbandry has heretofore flourished,—and the greater profitableness of raising sheep for mutton than for wool. Although this has been apparent in recent years, it has lately been made the topic of interesting reports from our consular officials to the State Department at Washington. As may be well known, the fine wool sheep of Australia are no longer to be found in such large numbers as heretofore upon the grassy slopes of the mountain range in the eastern part of that continent, but have been driven back and occupy the more open and sandy regions where there is little vegetation, bordering on the large streams like the Darling River and its tributaries. The same can be said concerning the sheep pastures in southern Africa, and the Argentine Republic.

The frozen meat industry in New South Wales, New Zealand and the Argentine Republic has been made the subject of recent consular reports. Seemingly, the first serious recorded attempts in the shipping of frozen mutton from these countries to European markets, were made about 1880-82. They were more tentative than otherwise, and, evidently, were not sufficient upon which to establish a permanent trade, till later, or until 1890, from which time this trade has been one of steady progress, till it has reached an annual export of about one million carcasses from New South Wales, 500,000 carcasses from Victoria, and 2,500,000 carcasses from New Zealand. The breed of sheep in most demand for this industry is some one or more of the English varieties, chiefly the Lincoln, and crosses with the merino. The industry in New Zealand has been more in advance than that found in other Australasian colonies. Of late, shipments of mutton to England have not proved particularly profitable, in a financial point of view, but, on the whole, have held more than their own, in comparison with the results obtained from wool growing alone. The best of Australian mutton can be landed at a fair profit in the London market, at 4½ to 5 cents per pound. The refrigerating machines, it may be noted incidentally, used in Australia, are mostly those made by a concern in the United States.

In regard to the trade in New South

Wales, about one-half of the sheep exported are killed at or near the port of shipment, and at once frozen, and after a week to a month in cold storage, are shipped. A large number, however, of sheep are killed five hundred miles inland, where they are chilled, and then sent in cold storage cars to Sydney, where they are hard frozen, preparatory to being placed on board the ship. The system of freezing in the Argentine Republic, for preparing the mutton for export, is presumably similar to that in vogue in Australia, to the effect that after separating the heart, kidneys, tongue, etc., leaving only the bare carcass, the mutton is subjected to the freezing process, 15 to 20° below zero, in a chamber that registers 50° below freezing. When thoroughly hard, the carcass is sewn up in a thin cotton cloth and transferred to the refrigerating apartment on the steamship. The system of chilling simply, instead of freezing, has been tried at only four degrees below freezing, but we believe that it has not proved satisfactory, owing to the temperature on crossing the equator. The advantage of the chilling system is for the preservation of the meat more in its natural condition.

The number of sheep slaughtered for export in the Argentine Republic is estimated at 2,300,000 animals per annum. The average weight of the carcasses being about forty pounds dressed.

It may become a matter of some moment in the course of ten or fifteen years, from what quarter of the globe wool is to be obtained for the needs of the world's manufactures. Of course, it will depend wholly upon the relative value of the wool and the mutton trade, with much to favor the latter, because it has too products upon which it can depend—wool and meat, while the former has but one product of any great relative value, i. e., wool.

—Tops are graded according to the fineness of the fibre, and are known as 60's, 70's, 50's, 32's, etc., representing the spinning qualities of the wool.

SOUTHERN COMPETITION.

The report of the committee on labor, of the Massachusetts Legislature, on the investigation into the causes of the recent reduction in the wages of the cotton mill operatives of Massachusetts, is far from being conclusive or satisfactory as throwing any light on the situation. The report of the committee contains nothing of value explanatory of the causes for these reductions, or for the depression in the cotton manufacturing industry of the State. The committee seem to be aware that the wages in the South are much less, comparatively: day labor being about one-third less, and the price of job work from 28 to 42 per cent. less than in the mills of New England, and that the labor laws, where they exist in the Southern States, are not strictly enforced. They further find that even in the other New England States, where the hours are fixed by law, of sixty per week, the enforcement of the statute is not so rigid as in this State, and that in many instances sixty hours practically mean sixty-two hours per week. They state that while the hours of labor in the South are longer than in Massachusetts, the speed of the machinery is not so great, except in the new mills, and, generally, the labor not so exacting.

One portion of the report is of special interest, as showing the proportion of foreigners that are employed in the New England mills, a condition of affairs little known in Southern mills, where most of the help are natives. Taking Fall River as a typical cotton manufacturing town, and it is noted that of the help there employed, 38 per cent. are French Canadians, 38 per cent. English, and 13 per cent. Irish, making 89 per cent. of the total number of employees, of these nationalities.

There is another item in the report that attracts attention, giving the proportion of expenses to the gross receipts received by a corporation whose returns approximate $3,000,000 a year.

The gross receipts are proportioned as follows:

Cotton,	.4443
Coal,	.0160
Salaries,	.0072
Labor,	.2795
Bleaching and finishing,	.0635
Taxes,	.0175
Insurance,	.0023
Interest,	.0184
Commissions and brokerages for selling,	.0190
Repairs and improvements,	.0284
Supplies and other expenses,	.378
Dividend,	.0652
	1.000

The committee believe that the national Congress should fix the hours of labor and generally control labor legislation, so that there may be uniformity in all the States; but they do not advise any formal memorial, but prefer to leave the matter with the congressional delegation of the State. The committee do not recommend legislative relief to manufacturers from the burdens of local taxation; notwithstanding the fact, which they find to be true, that the taxation in this State is much heavier than in the South. They recommend no changes in the labor laws of the State.

DEDUCTIONS FOR IMPERFECT WORK.

We mentioned in our last December's issue that a case was before the courts of this State, involving the construction of an act of 1894, relating to a deduction in the wages of employees for imperfect work. This law was invoked in an action of a weaver of New Bedford against a corporation for which the weaver was working. It was a case of a weaver producing imperfect cloth; the amount involved being only 50 cents, but the principle was considered to be of considerable moment to the labor organizations of that city, which took it up in order to obtain a court decision, which has recently been delivered by Judge Blodgett, of the Superior Court. The law in question is found in section 55 of act 508, 1894, which declares that the system of grading used by manufacturers shall in no way affect or lessen the wages of a weaver, except for imperfection in his own work; and in no case shall the wages of those engaged in weaving be affected by fines or otherwise, unless the imperfections complained of are first exhibited and pointed out to the person whose wages are to be affected; and, no fine shall be imposed upon any person for imperfect weaving, unless the provisions of the sections are first compiled with and the amount of the fine is agreed upon by both parties.

The decision of the court was in favor of the corporation, based on certain facts such as the posting in a conspicuous place in the room in which the weaver was employed, a notice specifying the price to be paid for weaving cloth of the first quality and the price for weaving the same style of cloth of the second quality, the quality to be determined by the superintendent, or his representative. Prior to weaving the cloth involved in this case, the weaver read and understood the notice referred to, and for anything that was known, assented to its provisions.

The court in its decision stated that the corporation intended to manufacture only first quality cloth, and the weaver was hired to make cloth of the first quality, and not that of second quality, and this fact was known and admitted by the weaver.

—The demand for wool and cotton fabrics for army and navy purposes is striking some of our mills most happily, obliged them to run their machinery full time during the day and to encroach largely upon night hours, to fill their orders. These, however, must be taken as isolated cases. The demand for bunting for flags has been so great that the mills that are capable of their manufacture are operating their machinery to its fullest extent, in order to meet the wants of the trade. Mills that are fitted to make army blue cloth are in full operation, in many instances day and night.

Southern Cotton Spinners' Association.

The annual meeting of the Southern Cotton Spinners' Association was held at Charlotte, N. C., May 12. The attendance is reported as having been large, representing mills in the Carolinas principally. Several prominent commission men of the North were also present. D. A. Tompkins, of Charlotte, N. C., was elected president for the ensuing year. Because of the prominent position occupied by Mr. Tompkins in the cotton manufacturing industry of the South, and because of his level headed ideas in matters pertaining to the welfare of this industry, we take pleasure in giving the following abstract of his remarks at this convention. He said:

"There is no competition between New England and the South in spinning and weaving. The trade of the United States is so depressed that the factories of New England and the South find difficulty in selling their product. If the new mills of the South had been built in New England the present difficulties would have come about just the same. We now manufacture in the United States about one quarter of the domestic cotton crop. The factories of the United States ought to be able to compete in the markets of the world with those of England and the European Continent. Excepting to a limited extent in China we enter very little into competition for the enormous foreign trade, the control of which is now enjoyed by foreign manufacturers less favorably situated than those of the United States.

"If all the factories of New England should move South, the need for extended markets would still remain. Such a movement would not increase the number of purchasers of American made goods. Controversy about the advantages and disadvantages of New England and the South contribute nothing towards the betterment of trade for the North or South.

"As matters now stand the condition of the cloth trade is very unsatisfactory in the South and in New England. The condition of most of the yarn trade is also unsatisfactory. A few kinds and numbers of yarns are selling fairly well in both sections. There is possibly a differential advantage in making coarse and medium yarns and cloth in the South, but this is not enough to make the South prosperous when New England is pinched.

"The measures of relief are the same for both sections. The relief can best be brought about by co-operation of all who are engaged in cotton manufacture in the United States. The people of the New England States, the Middle States and the South should work together for the improvement of the trade in American Cotton goods. In my opinion an improvement in our trade can be brought about in two ways, viz.,

"First, by currency reform to improve our domestic markets:

"Second, by improving our merchant shipping to extend and improve our foreign trade. We have now a banking system which in the main is excellent but which has the disastrous defect of furnishing no basis of credit to the agricultural classes of the South and West. There is more money than is needed to do the business of the country, but under the present system it does not circulate in the country. Local credit for farmers and small local dealers is well nigh reduced to nothing. Every comptroller of the currency for the last twenty years has urged the need for the reform of our currency. The measure of relief most nearly agreed upon by conservative students of the subject is to permit national banks to issue, under the control of the government, bank notes secured by their own assets instead of by government bonds as is now done. By this means the property, the honesty and the energy of people in each locality would be vitalized and made available for the production and exchange of agricultural products and manufactured goods.

"For the improvement and extension of our foreign trade we need better shipping facilities and better trade relations with foreign countries that

consume the kind of goods that we make. If as a result of the Spanish War we come into such relations with Cuba, the Philippine Islands and Hawaii as will necessitate constant intercourse between the United States and those countries, thereby developing a good trade with each of them, then the war will have done us some permanent good. We have needed something to stimulate our interest in maritime affairs for the purpose of increasing our shipping and export interests. Foreign vessels will come to us willingly enough for our surplus agricultural products and for all of our raw cotton if we are willing, but it is their interest to handicap in every way possible the exportation of our manufactured cotton goods. Trade in our interest will follow our flag.

"The cotton manufacturers of the United States should in my opinion join together to procure the necessary legislation from Congress to improve our trade. No controversy between the sections will give relief.

"Curtailment of production can bring only the most temporary and unsatisfactory relief. We have reached that point in the development of the cotton industry where we make more goods than the markets which we now have will take. We have reached that point where we must improve the markets we now control and find some others also."

Cotton Manufacturing in Massachusetts.

Editor Textile World:

Your May issue, page 64, contains what purports to be a synopsis of evidence given by me before the Committee on Labor at one of its recent hearings, with relation to Southern mill competition. This is obviously taken from a very faulty report in the Boston daily papers which I did not think it worth while to correct. But since you have repeated it, I call your attention to two or three statements which should read quite differently; passing over half a dozen errors of less importance.

The report makes me say that the saving on freight of cotton at this company's Southern mill amounts to from one-half to three-fourths of a cent per pound. But I accompanied this statement with the qualification that this is not a net saving, because freight on goods to New York, the great distributing centre, is several times as much as from Lowell; although on China goods sent via the Pacific coast, the difference in freight favors the Southern mill as compared with the Northern.

Again, I am represented as naming an actual saving of a cent a pound by reason of less cost of cotton in the Southern mill, and stating its amount in dollars. This is an entire misunderstanding on the reporter's part. Some of the questions by members of the committee indicated their idea that a fraction of a cent profit or loss per pound is a small matter. Purely to impress upon them the importance of even a small margin, I called their attention to the enormous production of such a mill as the "Massachusetts," and said, to illustrate, that a cent a pound applied to its annual output of eighteen million pounds meant ten per cent. on the capital stock, or $180,000. (I only wish we might get it.) In answer to a question I stated also the production of our Southern mill.

Still again: I am credited with saying that "there is no special objection to the Massachusetts system of taxation." But I did not say so. I related some of the circumstances of the change in the method of assessment of mill property in Lowell, brought about by suits of various corporations against the city in the last ten years; and said that, "so far as the Massachusetts company is concerned, we do not find fault with the present local method."

At the hearing referred to I was the only witness before the committee; and what I said was in the course of a rapid colloquy of more than an hour with various members, so that I doubt if even a stenographer could have got my story straight; much less a reporter in "long-hand."

Truly yours,

W. S. SOUTHWORTH.

Lowell, Mass.

Cotton Spinning in Japan.

Consul-General Gowey sends from Yokohama, a clipping from the Japan Times relative to the cotton-spinning industry during the six months ended in February 1898. The clipping reads in part:

The last half year was a critical period for not a few spinning companies, and, upon the whole, a highly trying time for all engaged in the industry. During the six months in review the number of spindles in operation was, on an average, 781,619,

against 592,425 during the corresponding half of the previous year. The cost of production was increased in all items, while the market price of yarns rose only very little, thereby subjecting all the cotton mills to serious troubles. With some mills the profit cleared per spindle ranged between 2.077 to 4.378 yen ($1.03 to $2.18), but in others no profit at all was declared. However, taken as a whole, the profit declared was 8.8 per cent. per annum, as against 14.3 per cent. declared for the previous half-year. This general result must be regarded as fairly good, considering the adverse circumstances. For, while the price of coal rose by 75 per cent., the wages of male and female operatives by 16 and 18 per cent. respectively, and the market price of raw cotton by 7 per cent., the rise of the yarn market did not exceed 1 per cent. Under such circumstances the cotton mills could not spare much in favor of reserve funds, and a sum corresponding to only a little over 1 per cent. of the total paid-up capital was laid by.

The following additional statistics taken from the Japan Gazette, show the state of the cotton spinning industry in Japan during December, 1897:

Total number of spinning mills existing	65
Number of spindles	773,738
Weight of yarn spun, pounds	17,406,274
Weight of cotton consumed, lbs	20,471,141
Weight of waste cotton, pounds	2,770,280
Weight of coal consumed, pounds	43,886,091
Aggregate horse power	21.610
Number of male operatives employed	12,672
Number of female operatives employed	42,656
Number of working days	26
Average daily working hours	12¼
Average daily wages of male hands, cents	11.6
Average daily wages of female hands, cents	7.2
Cost of one bale of yarn	42.725

A Discovery.

R. J. Redding, Director of the Georgia Experiment Station, Experiment, Ga., writes us in a recent communication: "I have made a discovery on my examination of varieties of cotton, which, so far as I know, is an original discovery; and that is, that all varieties grown in this country, excepting the Sea Island, are without the purple spot at the base of each petal inside of the flower, excepting the King's Improved. I have observed quite a number of varieties imported from Asia, Egypt and South America, and among them all, I have never seen a variety that did not have a purple spot more or less distinct at the base of each petal. I am inclined to believe that this purple spot is a specific mark, or at least, its absence is a specific mark. It does not appear in varieties of Gossypium herbaceum, unless they have become mixed with some other species. The characteristic spot, belongs to the okra, althea, and other genera of the malvacea. It is quite marked in the Sea Island variety, which is universally admitted to belong to a different species from our ordinary uplands."

Wild Silk Reeling in China.

The Cheefoo Filanda, as the establishment for reeling wild silk by machinery is known, is an interesting enterprise for several reasons, one being that it is the only filature in China in which wild silk is reeled by steam. The British acting consul at Cheefoo states that this establishment conducted by a very enterprising Cantonese with Chinese capital, is, as a commercial undertaking, rather in the tentative stage, one difficulty being to maintain a full and regular supply of cocoons, and another to keep up the full strength of the hands employed. The cocoons are procured, not only from the Province of Cheefoo itself, but from the South Manchurian regions, known as Liaotung, of which the little-known town and junk anchorage of Ta Tung Kow is the chief port and outlet. The filanda, when working full power, can run 580 reels, each employing one coolie, but the average number in work is about 540, and this number includes some 120 apprentices, mostly boys. The hours are about 12 to 13 a day, and it is stated that though the factory rooms are large, airy, and lighted from the north, the coolies are not very healthy nor clean, and they suffer greatly from strain on the eyes. The system of payment is to give each man daily, food worth one cent, and one cent per ounce of silk reeled. The pay also varies somewhat accord-

ag as the thread is wound from 4 cocoons (the best), from 8, or from 16. Broadly speaking, however, the most a skilful and hard-working hand can turn out in a day is 6 ounces, which with his food and small gratuities means that he can earn from 10 to 11 cents a day. Nothing is wasted. The so-called waste silk, or coarser outer coating of the cocoons, being used for making plush, and the black and unpleasant-looking pupa finding a ready sale as an article of food, though, as the consul says, in what form and by whom eaten, is somewhat of a mystery. The machine-reeled thread is very different in appearance, even to an outsider's eyes, from the thread when reeled in the customary way by hand, which looks coarse, dirty and irregular by comparison.

Persian Wool.

The most important districts in Persia in which wool is produced are Khorassan and Kerman. There are innumerable kinds of wool, and the annual production is estimated at 10,000,000 kilos. But only a third of this raw produce is exported, because (1) a portion of it is claimed by the carpet manufacturers; (2) of the difficulties of transport, and (3) of the low prices which are offered for this produce through defective washing and the burs clinging to it. Nevertheless the wool of the ordinary sheep is valued on account of its glossiness and good quality; but it is rather the goats' hair from Khorassan, of which shawls are manufactured, which come to the English market via Bombay. About 1,200,000 skins with 1,400,000 kilos. of wool are annually exported from Binder Abbas, Bushire, and Mohammerah, one-third of which goes to Bombay and the remainder to Bussorah. In the latter place the Persian wool is mixed with Turkish, after which it is sent to Marseilles or direct to America.

Gen. Stephen M. Weld, Boston, with others, interested in a new cotton compress, being built by the Planters' Compress Co., has been in Texas in behalf of the new round bale. We learn this bale has made quite a favorable impression among cotton producers and dealers. It is stated that an office will be immediately established in Memphis, Tenn., by the company.

Ventilation of Textile Factories.

Abstracts of paper read by W. H. Casmey before the Society of Dyers and Colorists.

(Continued from May.)

The fan is applied with great success for removing dust from wool-sorting boards. The act of Parliament states the velocity through the 4in. pipe connecting the boards to the horizontal duct shall be 900ft. per minute, which gives to each man 4680 cubic ft. per hour. With an installation recently applied we find the first opening about 9ft. from the fan, the extreme one being about 220ft. away; the maximum reading given by the anemometer is 2300ft. per minute and the minimum 1850, whilst the average of the whole works out to 2050ft. per minute. One point in connection with this type of installation is that the warming of the air should be taken into account, otherwise the workers are likely to feel the effect of this large volume of air in winter.

The gassing room is one of the worst departments to deal with, because it is one where ventilation must be as near perfect as possible.

The gas jets through which the threads pass must not be moved by the air currents, and the nuisance from heat and CO_2 along with the fine dust is so great that in many cases the air has to be changed 120 times an hour. Without proper inlets this would be impossible. The air is allowed to pass under each frame and to enter the room near the floor line, directly under the gas jets. By this arrangement the inlet area is nearly half as great as the floor area, so that taking the room indicated, the floor space is 3000 square ft. and the height 14ft.; this gives a cubical capacity of

42,000ft. The air changed twice per minute calls for a supply of over 5,000,000 cubic ft. per hour, and to do this work six 36in. fans are used, and still the velocity of the air current is not more than 1ft. per second. This is better understood when I state that a velocity of 3ft. per second is scarcely preceptible to the senses.

It is a common occurrence to apply fans to sheds with a floor area of 50,000 to 60,000 square ft., and to deal effectually with such a large space it is imperative that a number of fans should be used equally distributed, and it is also necessary to have some fans blowing in near the centre as well as having good air supplies around the walls.

If, however, air cannot be admitted through the side walls, the whole supply should come in through the roof, so that no draughts are felt when the doors are opened. I have known several cases where ten or twelve and in one case sixteen fans were fixed for exhausting from a weaving shed and not a single inlet for fresh air had been provided; the fans under such conditions were practically useless. One firm I remember some years ago were recommended to fix ten fans in their shed; they however decided a large fan would do better, so fixed one at the far end of the shed close to the boiler-house admitting air at the opposite end. The result proved most conclusively ventilation was not their forte. The shed had an area of about 40,000 square ft., and finds work for about 600 hands. The heat from so many workers and as many gas jets drawn to one end of the shed by the fan caused the warmest part before the fan was installed to increase in temperature about 20 degrees. The results could only be expected, as the fan swept the whole vitiated air and heat in the shed towards itself, thus increasing the evil at that point. The same people would not have been surprised to find a large pile of dust at one end of the shed if all the weavers had been sweeping in that direction. The further the sweepers go, the larger the accumulation of dirt, and the more people the air passes over, the greater its impurity.

The large fan was taken out and ten smaller ones used, fresh air inlets being made at a point near the boiler house where complaints of being over warm came from; an even temperature can now be maintained. A point well worth remembering is never fix a fan at the warmest point in the room to be ventilated, but let the warm point be an inlet for supplying some of the fresh air, and fix the fan some distance away, the temperature can thus often be equalized. It is always essential to have a margin of fan power in a weaving shed. I have known cases where the temperature has been 80 degrees with not more than 65 per cent. of moisture; a shower of rain has fallen and in a few minutes the temperature has gone down 10 per cent. causing the humidity to stand at saturation point. With extra fan power such danger can be avoided.

The finishing and calendaring departments in mills are often found to give considerable trouble the year round. In summer the heat from the cylinders is almost unbearable, and in winter the warm moist air coming in contact with cold walls and windows quickly condenses, causing in some cases serious losses. In many cases large hoppers are fixed over the cylinders and outlet trunks carried through the roof, the heat from the machines warming the air and thus causing an upward suction, and in fine weather acting fairly well. In cold weather, however, the moist warm air condenses in the trunks and falls back on the material.

In many works the hoppers have been dispensed with, and a large fan been fixed over two machines, the result being more light in the room and making the machines get-at-able at any time. What is more annoying than to go to the dyeing department and find the steam so dense that it is

impossible to see more than a few feet around you. Let us consider for a moment why the vapor on such a morning is so dense. Suppose the outside air is at 32 degrees and all the water in the dyehouse is at the same temperature, the air would be quite clear, and we would be able to see all over the place from one point. In other words, unless there is a difference in temperature between the inside and outside there will be no moisture visible.

Air at 32 degrees saturated with moisture will carry 2½ grains per cubic ft., but air at 60 degrees will carry 6 grains, and the capacity of air for moisture practically doubles with every 23 degrees rise in temperature above that point. If, then, we raise the temperature of all the water in the dyehouse to 100 degrees each square ft. of dyebeck will evaporate a little over 1000 grains of water per hour, and the appearance of our dyehouse will now be very different; the whole interior will be one of fog, the density of which will increase in proportion as the temperature of the water increases, as when the water reaches boiling point over 30,000 grains of moisture, or a little over 4 lb. of water, will be evaporated per hour per square ft. If we now apply a fan for removing the steam, allowing it to have its air supply from the outside, we are not surprised to find the fan appears to increase rather than decrease the evil, and from what has already been stated the cause is easily found. With the dyehouse in proper working order the temperature will probably be 70 degrees, the air being saturated or holding about 9 grains per cubic ft. The fan brings air into the room at 32 degrees: this has the effect of cooling the air in the dyehouse, and so robbing it of its heat or power for holding water in suspension; part of its strength being gone it begins to deposit its burden first on the iron work and slates, and later on the wood work.

The expense and annoyance caused by condensation in dye-houses and similar places is too well known to require enlarging upon here. We must supply air to our dye-house as near the inside temperature as possible. In a large dye house I dealt with some years ago, two 72 in. fans were fixed discharging through the roof. These fans were supplied with warm air from the finishing and tentering rooms adjoining, and the results were all that could be desired. The two rooms which supplied the warm air were much pleasanter for the workpeople since the fans were applied to the dye-house, and thequantity and quality of their work was very much improved. I have chosen this installation for illustration partly to show the difference between the pressure and the volume fan. This dyehouse belongs to a wealthy firm in Lancashire, who, in erecting the building consulted with a firm of enginers as to what should be done to prevent condensation. They were advised to fix two large pressure fans and have a cover over each dye-vat, connecting such covers to horizontal ducts running through the dye-house, at the ends of which the pressure fans were fixed; this was done, the whole costing £550. Needless to say, it was as complete a failure as the two 72in. fans have been a success.

In connection with the woolen trades the question of drying is well worth attention in a paper of this kind. Drying depends on the quantity, quality, and the temperature of the air brought in contact with the material to be dried. The secret of all drying is in fully understanding the affinity of air for moisture at different temperatures.

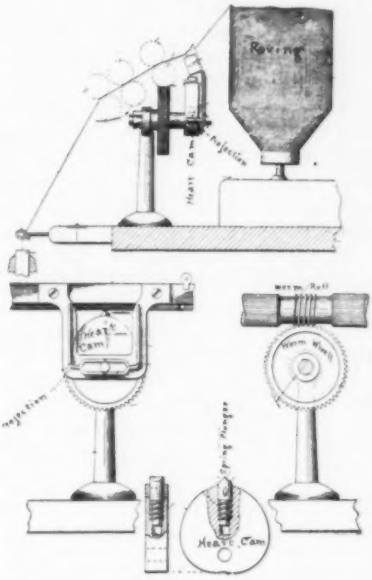
Take, for instance, a yarn-drying stove with the material hung in hanks one above another (a very common practice) the room 10ft. high. The moisture from the first two or three rows will rise up over the hanks above, and unless there is some arrangement for preventing it will condense there, the bottom hanks thus

having the best chance. I will give you one case which came under my observation some years ago illustrating this point. The drying-room was 45ft. long, 15ft. wide, and 6ft. high; at one end was an exhausting fan and at the other a large warming battery, the idea of the parties who had arranged this installation being to keep a constant flow of warm air through the room, expecting to have all the material dried at one time. Note the result: the 15ft. nearest the fan could not get dry in less than double the time 15ft. nearest the battery. I hung three pieces of material (weighing each one) at points 10ft., 25ft., and 35ft. respectively from the steam pipes; each piece of cloth when hung weighed 32oz. In ten minutes the one nearest the steam pipes was dry, weighing 24oz., the next one weighed 30oz., and the one 35ft. away weighed 40oz. The moisture evaporated at the warm end of the room was done at the expense of reducing the temperature of the air, which, being unable to carry the moisture, deposited it on the material nearest the fan. Many of you who are here have probably come across similar cases. The remedy was a simple one. We made two more inlets so that the warm air entered the room at three different points 15ft. apart. The temperature of the room was thus kept constant and the drying in all parts practically the same.

Heart Motion for Spinning Machines.

A device has recently been invented, which we illustrate herewith, relating to drawing and evening machines. By the devices heretofore employed, the leather covering of the rolls of the spinning machines has been materially injured by lost motion of the actuating mechanism for the roving guides, which, in turn, injures the yarn to a considerable extent. The object of the present device is to overcome the disadvantages heretofore encountered, and thereby causing the rolls on the spinning frame and mules to run considerably longer, by the positive traverse motion, and the same may be applied to slubbers, speeders, and fine-roving frames. the object of this motion therefore is to employ in connection with the ordinary mechanism that which will give the roving traverse a positive action and take up the lost motion incidental to machines of this character.

We think that all of our readers, who may be interested in this new idea, will fully understand its purposes without any detailed reference to the drawings, which, to the practical man, tell their own story. We may



say that the front and intermediate rolls are supposed to be formed of fluted steel. Above them are other rolls which are covered with leather. In the rear is a roll co-acting with the back roll. In use, the cam, which is the principal feature of this invention, operates the roving rod or guide in the usual way until the point and the hollow of the heart come to two projections, when the spring plunger, pressing on one projection, forces the roving guide along so as to bring the second projection into the hollow of the heart, thereby taking up the lost motion.

Cotton Bleaching.

C. Delescluse, of Rouen, patents an improvement in bleaching cotton which dispenses with the ordinary preliminary treatment in an alkaline or soap bath, which the inventor asserts has the effect of weaking the fibre and giving it an earthy and yellowish appearance. Moreover, after fibres so treated have been bleached with chlorine, it is impossible to clear them completely of the chlorine, and consequently the textures cannot be finely or uniformly dyed. This invention obviates these evils by chemical treatment and special stretching and drying operations. The chemical treatment consists in adding to the ordinary chlorine bath a solution composed of about 2½ kilos. of treacle, 2½ kilos. of starch, and 10 kilos. of nitric acid of 36 deg. Be., these substances being mixed cold and heated on the water bath, and the mixture being diluted with water till its density is about 1 deg. Be. This forms the bath in which are immersed bobbins holding skeins of cotton through which the liquid is drawn or forced. After this treatment, chlorine effects complete bleaching without affecting the strength of the fibres or their downy feel. The molasses and starch of the mixture serve as vehicle for the bleaching agents, reducing their corrosive action. The skeins of bleached material are taken from the round boxes in which they had been treated with chlorine and are gradually stretched on suitable reels, and while held on the stretch, are exposed to steam and then dried by strong air currents. Cotton treated in the above manner can be blued and dyed in the same vat as that employed for the bleaching treatment.

Textile Ornamentation.

FENWICK UMPLEBY.

Head Master of the Designing Department, Lowell Textile School.

CHAPTER VI.

Before leaving this subject, we must not neglect to refer more particularly than we have hitherto done to the manufacturer of tapestry, which has occupied a prominent position in some of our English workshops. Tapestry is neither weaving in the strict sense of the term, nor embroidery, but a combination of the two, for although worked upon a warp stretched out upon the frame of a loom, it has no weft thrown across these threads by either a shuttle or any such appliance, but the warp is worked in by the needle with many and various colored threads. This art seems to have found its way from Egypt, through Western Asia, to Europe, and, after the lapse of much time, to have reached England, where the handicraft was taken up by the monks, who became some of the most skilled workmen employed in its production. Although some tapestries have been discovered which were undoubtedly woven at an early date, we have no reliable record of the existence of looms prior to the sixteenth century. There have, however, been published several notices which prove that English manufactories existed in the middle ages. Matthew Paris tells us that among other things which Abbot Geoffrey had made in the reign of Henry I., (1100-1135 A. D.) for his church (St. Alban's) were three reredoses; the first one worked with the finding of the body of St. Alban, the second representing the parable of the man who fell among the thieves, and the third depicting the prodigal son. While in London, Simon, (Abbot of Ramsey), bought looms, staves, shuttles and a slay. In 1344 A. D., Edward IV. passed a law for the regulation of the tapestry manufacture, and in 1392 the Earl of Arundel disposed by will of the hangings in his castle, which had been lately made in London, in blue tapestry, with red flowers. Later still, in 1595 the Monks of Canterbury manufactured a tapestry hanging for the walls of the choir of the cathedral, which hangings are now at Aix, in Provence. In the reign of Henry VIII., about 1509, a workshop was established at Barchester, in Warwickshire, by William Sheldon, with the

help of the master tapestry maker, Robert Hicks, but it was of no importance in an industrial point of view till the 17th century. In the reign of James I., a new factory was established at Mortlake, in Surrey, by a skilled artist, Frances Crane, whose products were patronized by the king, and afterwards by his son, Charles I., for whom were manufactured a great number of hangings noted for their beauty and the excellence of their execution. Amongst other pieces wrought, Charles ordered the reproduction of the fine cartoons of Raphael, representing the acts of Christ and the Apostles. The cartoons had been found in the manufactory at Brussels, where they had been lying forgotten from the time of the production of the tapestries for the Vatican, and Charles, by the advice of Rubens, bought them. Most of these pieces of tapestry, especially the acts of Christ and the Apostles, were bought by Mazarin at the sale of Charles I's property after his execution, and have finally found a resting place in the "Garde Meuble" at Paris. The French Government in 1876 sent them to the Exhibition of the History of Tapestry, where, in spite of their state of decay, the cleverness perceptible in their manufacture and the taste displayed in the arrangement of the borders which act as a frame, gained the greatest admiration.

The Civil wars which troubled England after the death of Charles I., and the Puritanical rule, not only put a stop to the productions of the Mortlake factory, but exercised a most depressing influence upon art generally throughout the country. All the formative arts may be said, for a time, to have ceased to exist, and nothing remained but a never-failing, sparkling stream of poetry to prove that we have never ceased to rank amongst the most imaginative people of the world. Under happier auspices, however, the artistic sense began again to reveal itself in painting, engraving and some other branches, and these arts have continued ever since to flourish in England and in some cases to hold their own in honorable rivalry with foreign competitors, and at the Restoration, when Charles II. was put upon the throne, the Raphael cartoons, which Cromwell, to preserve them for the nation, had bought at the sale of Charles I.'s goods were once more sent to Mortlake for reproduction. The looms of the factory were occupied in providing decorations for royal palaces until the death of its founder, 1703, caused a stop to be put to its productions. There was a workshop established in Soho, London, that tried to compete with the Mortlake, and some pieces of tapestry, descriptive of rustic scenes, have been preserved, which were woven in 1758. There was another at Fulham, occupied chiefly in producing tapestry for furniture, in the style of that of Beauvais, but this was closed in 1755. After the revocation of the Edict of Nantes, a French refugee bought a tapestry manufactory established in England and transferred it to Exeter, where for a time it prospered, with the help of some artisans from the Gobelins. Since that time England has entirely ceased the production of the high class storied tapestries, and has turned her attention to low warp carpets, as well as to really woven tapestries, and to many other branches of artistic manufacture. But, although the weaving itself of textile fabrics has reached an unsurpassed degree of perfection, the art of ornamenting them can scarcely be said to have surmounted the disastrous consequences resulting from the civil wars, and the Puritanical rule of the 17th century. Yet without a revival, our textile industries cannot hope much longer to maintain their position in the foreign market; hence, the paramount duty incumbent on our manufacturers, master weavers and others interested in the commercial prosperity of the country, to leave nothing undone that will tend to develop and foster a genuine artistic taste among the people, and especially among the intelligent artisans employed by them, for we must confess that we have a great amount

of labor and study to pass through before we can reach, much less surpass, the skill and taste displayed by our forefathers.

Baling Cotton.

Editor Textile World:

You have in your May number, in answer to a question from a correspondent, regarding the size of cotton bales on the plantation, a reference to an effort in this State of changing the plantation size of the bale to 24 inches by 54 inches. The particular effort alluded to is undoubtedly that of 50 bales of cotton which were shipped through this port to Liverpool recently. One of these sized bales is still on exhibition in the Cotton Exchange. It is not, however, a new bale. It was made in an ordinary rectangular gin box, originally 28 inches wide by 58 inches long. The box was cut down to 24x54 inches by simply knocking out the planks of the box, and nailing strips of 2x4 inch plank on the framework of the press and doors, and 100 bales, of the average weight of 570 pounds each, were then made in the box in the ordinary manner, except that, as there was a scarcity of seed cotton at the time, only 16 bales were made from newly ginned cotton, the remaining 84 being reboxed cotton, originally baled in a 28x58 box. The results were much better with the newly ginned cotton, as it packed more closely and the reboxed bales came out wider and longer, and spread about twice as much in a compress.

There was found to be no necessity for strengthening the gin box as the lateral pressure was very slight so that no great strain fell on the sides of the gin box and doors, and all the increase of pressure was on the follow block, the top beam and the tie rods, which were already amply strong. Neither was any extra pressure required in the compress, but the compressed bale when released from the press retained its form with but very little expansion and the bands held the bale more firmly on account of the cross section more nearly approaching a square. The extraordinary density reached, or course, was due to the increased pressure to the square inch, the total pressure on the bale in the compress being the same in any case, namely 1800 tons, or 3,600,000 pounds. But the pressure per square inch on the small bale is 2472 pounds as against 1814 on the old style bale. More of the small bale is covered by the bagging and it shows no strips of white on the sides after compression.

The S. S. Maria of the Serra Line, took 50 bales of this cotton to Liverpool at 23½ cents per hundred pounds on account of its greater density when she was asking 37 cents for ordinary cotton. The latter rate, of course, is quite low and the fixed charges for stevedoring and wharfage being the same in any case, the amount of rebate is less than it would be at the average rate from this port to Liverpool which is about 45 cents. The S. S. Ida of the same line offered to take the cotton to Havre at 28 cents against 46 for ordinary cotton.

The shipment referred to measured 39½ pounds per cubic foot alongside the ship. The bale now in the Cotton Exchange measures 41, and some others, I understand, run as high as 49. I am informed the average density of Egyptian cotton is about 35, and of East Indian 33.

A very vigorous effort is now being made by associations of cotton handlers of various kinds in Texas to bring about a reduction of all the boxes in the state to the size of 24x54.

S. O. YOUNG, Secretory,
Galveston Cotton Exchange.
Galveston, Texas.

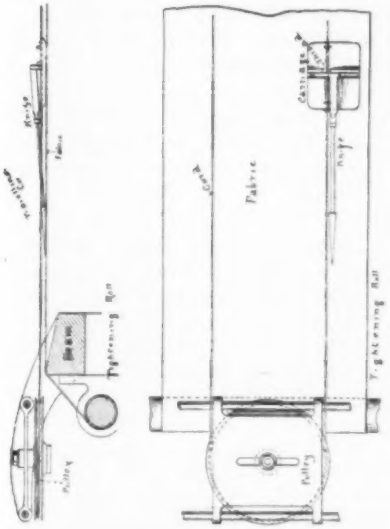
Apparatus for Cutting Piled Fabrics.

We give an illustration of a recently invented apparatus for cutting piled fabrics. The apparatus refers more particularly to the cutting of piled fabrics, in which the knife is traversed along the cloth to be cut.

"Heretofore many arrangements have been devised for releasing the

knife from the moving part which traverses it along the cloth to be cut, the release taking place whenever the knife pierces the cloth or encounters any obstruction; but all such arrangements have consisted of more or less complicated combinations of mechanism, including some device which comes into contact with the cloth in the event of the knife piercing the cloth.

This device is intended to effect the release of the knife from the traversing power in the event of any increase in the normal resistance offered by the actual cutting of the pile of the cloth. Thus the knife will be released in the event of its piercing the cloth,



or it may be released without the cloth being pierced if the cutting edge of the knife becomes dull, and thus offers increased resistance, or if the guide becomes broken or bent, so as not to be capable of guiding the knife, or if the knife meets with any obstruction which in the ordinary course would break it, or if the "knife and guide" turns out of the race into the uncut face of the cloth.

This invention enables an ordinary fustian-cutter's knife and guide, free from any attached mechanism whatever, to be used with safety, thus facilitating the work of the operator.

Instead of attaching the knife-carriage firmly to the traveling cord the cord is passed through a longitudinal groove in the carriage and kept in position by rings or staples fixed to the carriage in such a manner that the cord may run freely through the groove and staples without obstruction. The carriage is attached to the traveling cord by a thread of ordinary thin sewing cotton or the like. The cotton thread, or equivalent, is only of sufficient strength to actuate the carriage with the knife and guide when the knife is cutting the pile of the cloth in the ordinary manner, but is weak enough to break if more than the normal resistance is encountered.

When the thread breaks the carriage on which the knife is placed, ceases to be actuated by the traveling cord, but remains stationary on the cloth while the cord travels freely. The carriage and knife being thus arrested any damage to the cloth is prevented. The cotton thread or its equivalent may be proportioned in strength to the strength of the pile which it has to cut.

In the case of corduroys or similar strong fabrics a thread of linen or the like may be required, but for ordinary velvets and velveteens a thread of sewing cotton is sufficient.

Textile Schools in Rhode Island.

An act has been proposed in the General Assembly of Rhode Island, providing for the establishment and maintenance of a textile school in Providence, R. I., subject to the control of the trustees of the State Normal School. The act provides for free tuition in this school for all bona fide residents of the state. For non-residents, a tuition is suggested, the amount to be left to the judgment of the trustees. The importance of this matter has been called to the attention of the Assembly by the State Board of Education, which has made a special report upon the subject, the merits of which are impressed upon all those interested in such education,

by the excellent work that has been accomplished not only abroad, but also in this country, at Philadelphia, and latterly at Lowell.

The investigations that have been made by the Board of Education have only strengthened their convictions that a movement of this kind is not only advisable,but that effectual steps should at once be taken towards a beginning in this direction. The city of Providence is unhesitatingly selected as the proper location. The Board does not recommend any large expenditure of money, nor any elaborate equipment of the school in the way of machinery, to the extent that is provided in the schools at Philadelphia and Lowell. In fact, the Board suggests that no provision be made at this time for machinery for the preparation of yarns, but that the requirements for the latter be met by purchase.

In order to cover the needs of the school, according to present plans, in addition to the assistance which may reasonably be expected from the friends of the school, $17,500 should be raised. In reference to the cost of maintenance, the Board thinks, from the best information at their disposal, that the expense for the first year, above and beyond what will be met by the normal school facilities, which will be offered, will not exceed $5,000.

The importance of such a school, and of technical education, to those who are engaged in the manufacturing industries of the State, may be somewhat appreciated by the value of instruction given by such schools to the industry in Germany and other European countries, which are maintained very largely by State and municipal contributions, and those obtained from local manufacturers. As one of the best examples of the value of such a school to a manufacturing locality, is the one at Crefeld, which has made that city one of the most prosperous manufacturing centres of Germany. Indeed, the influence of this school has affected most favorably the textile industries of that country, so that various kinds of goods formerly imported from France and England are produced of such quality and in such quantities that they are exported instead of imported. The possession of a certificate from one of the leading German technical schools enables its possessor to obtain employment immediately upon graduation.

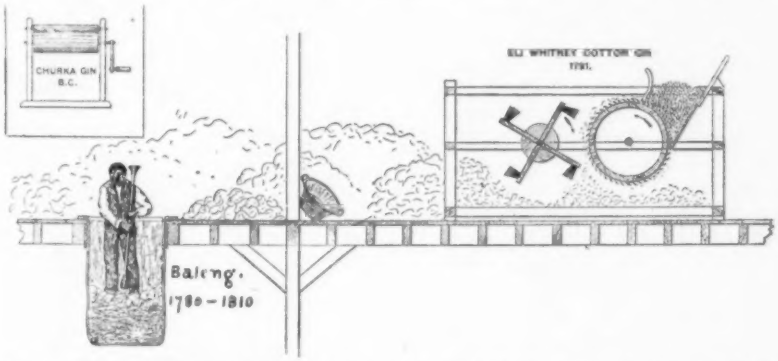
In a recent number of the North American Review, the eminent English statistician, M. G. Mulhall, discusses the industrial advance of Germany, showing how a nation which increased in population about thirty per cent. in twenty years, added eighty per cent. in its working power, more than doubled its textile industries, and nearly trebled its metal productions, so that the wealth of the nation increased twice as fast as the population. This great increase in the wealth and development of the industries of Germany has been due, in a great measure, to the advanced state of technical instruction in every part of the empire.

—The occupier or manager of every cotton factory shall supply with each warp, to each person engaged as a weaver in said factory who is paid by the piece, cut or yard, a printed or written ticket containing the following specifications as to the work to be done and wages paid, to wit:—The number of cuts; the number of yards per cut or piece; the price per yard, cut or piece; the number of picks per inch; the number of reeds to the inch. Said occupier or manager shall also suply to each person engaged as a frame-tender a specification of the number of roving and price per hank or hanks; and to each person engaged as a warper or web-drawer a specification of the number of threads in the warp and the rate of compensation; and to each operative who is paid by the pound a specification of the price to be paid per pound or pounds; said specification to be furnished in each case on a printed or written ticket within seven days from the time that said operative begins work.—Mass. Statute.

One Hundred Years of Ginning and Bailing Cotton.

Paper read by Geo. A. Lowry, Boston, Mass., before American Society of Mechanical Engineers, June, 1898.

In the year 1784 an American vessel arrived in Liverpool with eight bags of cotton, which were seized by the customs officials on the ground that it could not possibly be American cotton; next year there were five more bags exported, six bags in 1786, and one hundred and eight bags in 1787. This was all Sea Island cotton (i. e., long staple cotton), for until 1791, when Whitney invented his cotton gin, upland cotton (i. e., short staple cotton) was practically unknown. This short staple cotton adhered so obstinately to the seed that an operator could clean only one pound per day.



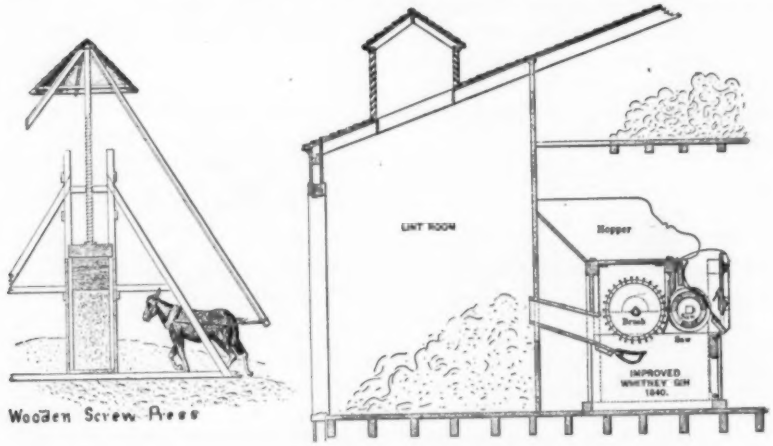
Two years after Whitney's invention of the gin, the crop had grown to five million pounds; ten years later, to thirty-five million pounds; and in twenty years it had grown to eighty-five million pounds, while the estimate of the crop last year (that of 1897) was five thousand, five hundred million pounds. Of this, only fifty million pounds is Sea Island cotton, the remainder being upland.

In the year 1791, two operators could produce two pounds of cleaned cotton per day. With the present system of automatic feeders, etc., only two men are required to remove the cotton from the wagon and attend to six gins producing twenty-four thousand pounds of cleaned cotton daily.

Previous to the invention of the Whitney gin, a small roller gin (invented in India some centuries ago, and called a "Churka"), was used. It consisted of two rollers placed parallel to each other, with a small space between, and revolving in opposite directions. One of the rollers was smaller than the other, the smaller one being of iron and the larger of wood. The operator turned the machine with one hand, and fed in the seed cotton with the other. Only long staple cotton (which is easily detached from the seed) could be cleaned with this machine, and its output was about three pounds per day. Most of the roller gins of today are modifications of this type, the widest departure being that of the McCarthy gin, which consists of a leather roller and two steel blades, one of the blades being pressed against the roller, while the other blade has a rapid reciprocal movement, and strikes the seeds as they are drawn against the edge of the first blade, by the adhesive action of the cotton to the rough surface of the revolving leather roller. This rapid striking movement detaches the seeds from the fibre.

The original Whitney gin consisted of a drum with rows of wire hooks, or teeth, inserted in line around it. As the drum revolved, these teeth passed between a grate, or grid, the bars of which were sufficiently far apart to permit the teeth to pass without touching, but so close that the seed could not pass between. Another grate, wide enough to allow the

cleaned seeds to drop through, was mounted to form a hopper for the seed cotton, and hold it against the revolving drum. The revolution of the drum, coupled with the drawing action of the teeth against the cotton in the hopper, caused the cotton also to revolve and form into a roll, thus resulting in continually presenting new material to the teeth, and giving the cleaned seed a chance to drop through the wider grate forming the hopper. As the teeth, or hooks, passed through the roll, they became charged with filaments of cotton, and the seed being held back, either by the surrounding material pressing against it, or by its contact with the forward grate, brush consists of a drum, with rows of bristles inserted lengthwise across it, and with wings on the end to give an air current. Rotatable plates have been placed at the ends of the cotton roll to reduce the friction and assist it in revolving, and perhaps the most important improvement is the Mote board, invented by Eleazer Carver in 1845, which regulates the current of air produced by the wings on the brush so nicely that the current is just strong enough to carry off the cleaned cotton, but not enough to carry off the motes, or immature seeds which thus become separated as wheat is from chaff. The addition of this air current, and the passing of the



caused the filaments to be detached from the seed and carried forward by the drum, until they were removed by a brush revolving with greater rapidity in an opposite direction, and in such a manner, that the bristles brushed the teeth in the direction in which they were inclined. This removed the filaments of cotton from the drum, and the speed of the brush was sufficient to clear itself by centrifugal action. The Whitney brush was four-armed.

Numberless patents have been issued, and a few improvements made on the Whitney gin, but the principle remains the same. Instead of the wire teeth fixed in a drum, we have teeth cut out of a circular metal plate. The cotton through flues to a lint room, or condenser, also materially assists in opening up the neps ocassionally caused by the films of cotton doubling around the teeth and becoming snarled.

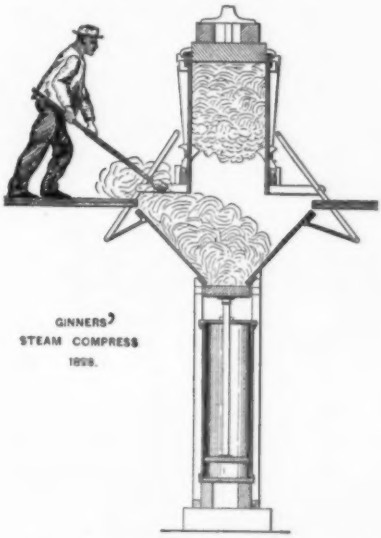
The lint room was merely a large compartment, or box fitted with screen ventilators, into which the cotton was blown, the ventilators allowing the air and dust to pass away.

In 1878, a condenser was added and made a part of the gin. This condenser is a revolving screen, and as the cotton is blown against it, the air passes through, leaving the lint on the face of the screen in the form of a bat, the air passing out through the bottom and ends of the condenser, and

carrying the dust and dirt with it; the screen, as it revolves, constantly presenting new surfaces to the oncoming cotton. A bat roll is placed over the top of the revolving screen and lifts the cotton from it, delivering it into a chute.

The capacity of a roller gin is about four hundred pounds daily. The capacity of the improved Whitney gin is four thousand pounds per day.

A roller gin consumes seventy-one thousand foot-pounds of power for each pound of cleaned cotton, against thirty-five thousand foot-pounds on a Whitney for the same quantity.



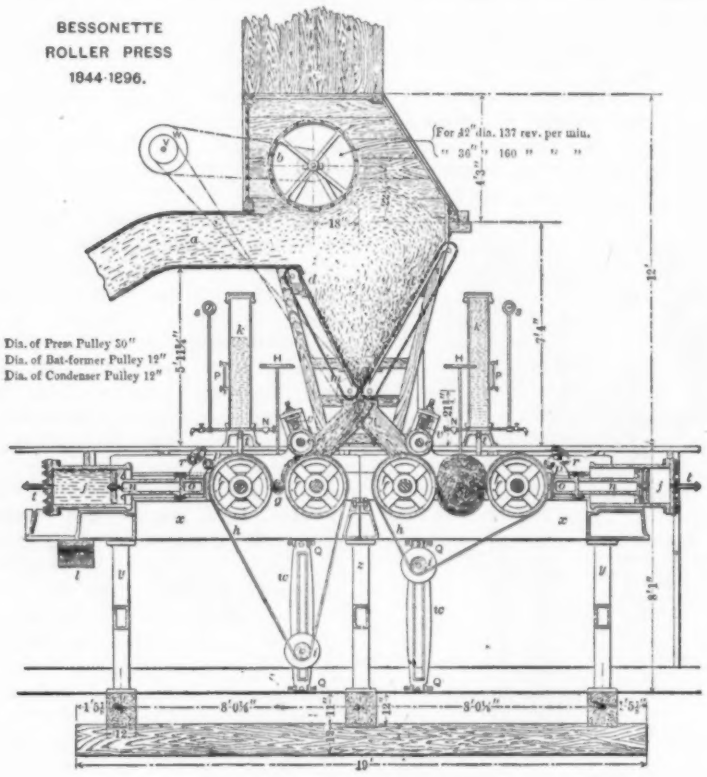
GINNERS' STEAM COMPRESS 1878.

The first system of baling cotton, used in the years 1780 to 1810, was that of tramping and mauling it into round bags about nine feet long and holding about 300 pounds, as shown in one of the accompanying illustrations. This compressed the cotton to about five pounds per cubic foot. Then was introduced the old-fashioned wooden screw press, illustrated herewith, which compressed to a density of about eight pounds. Between the years 1840 and 1860 were introduced the power screw presses, and about 1870, the steam press as shown herewith. The latter two forms of press are those most in use at the present time, and press cotton to about 12 pounds per cubic-foot. The best results from these give but one-fourth of a load. In 1845 was introduced the Tyler hydraulic compress, and in 1874, the Morse steam compresses were introduced for the purpose of re-compressing the bales put up by the planters and ginners. The immense outlay for such plants prevented their erection at other than central points and sea-ports; the cost for the compress alone being from $40,000 to $60,000, and requiring a steam capacity of three 150 horse-power boilers. The pressure exerted by these gigantic machines is from 5,000,000 to 6,000,000 pounds on each bale, or about 2,800 pounds per square inch; the bale while under the press being reduced to about 60 pounds density to the cubic foot; but so far, they have been unable to keep it from re-expanding when released from the press, and the average obtained is only 22½ pounds per cubic foot. Very few bales "dock" at Liverpool with a greater density than 20 pounds per cubic foot. In re-expanding, the bales assume a turtle back shape which prevents their being stored economically and necessitates "Jack Screwing" them into place when stowed aboard-ship. The regular charges at New Orleans for re-compressing, screwing, etc., are $2.04 per bale, and the job when finished is a mighty poor one.

The American Cotton Company, by their revival of the Cylindrical Baling Machine, have done a great deal to stir up the planters and ginners to the fact that their present methods must be improved or abandoned. This cylindrical bale (which consists in winding a bat of cotton around a core, and putting pressure on the layers, as they are wound, by means of receding drums in sliding boxes held elastically against them) was first made by the E. Carver Company at East Bridgewater, Massachusetts, in 1844, for J. E. Carver and W. F. Pratt. They spent $2,400 on the machine, but abandoned it because the mills objected to the difficulty of unwinding, and the felted condition of the cotton at the centre of the bale, caused by the lay-

ers creeping on each other, accumulating and concentrating the pressure, towards the centre. Each layer was necessarily less dense than the layer beneath, which it assisted in compressing, and the bale could only have an average (instead of a uniform) density, which was in inverse ratio to its diameter. (This peculiarity was strikingly exemplified some time since at the Ordnance Department at Washington, when they tried to wind a steel gun core with wire, the result being a sufficient accumulation of pressure towards the centre to crush the core.) Patents, were issued in 1847 to Mead, and in 1848 to North, for machines of this type, but until the improvements by Bessonette, in 1893, no material progress was made in bringing it into practical use. There are now thirty-five plants established, which, last season, put up sixty thousand bales of cotton, compressed to a density of about 30 pounds per cubic foot, the pressure exerted being one thousand pounds to the square inch. (It must be remembered that about 17 per cent. is lost in stowing cylindrical packages).

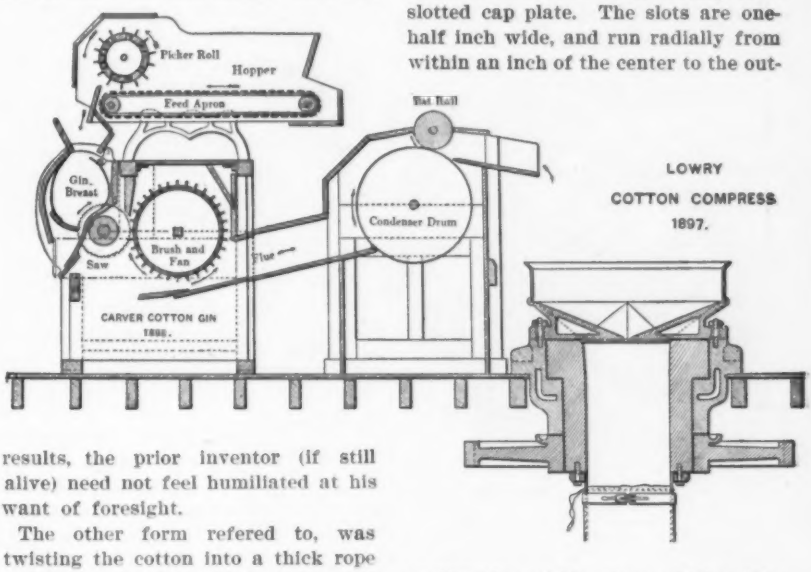
This form of press as now constructed is illustrated herewith, as the Bessonette Roller Press.


BESSONETTE
ROLLER PRESS
1844-1896.
For 42" dia. 137 rev. per min.
" 36" " 160 " " "
Dia. of Press Pulley 30"
Dia. of Bat-former Pulley 12"
Dia. of Condenser Pulley 12"

Section of Double Press, Bat-former and Condenser.

a—Lint flue.	*h-h*—Baling belts.	*n-n*—Piston rod.
b—Condenser drum.	*i-i*—Belt idler.	*p-p-r-r*—Tension rolls.
c—Dust flue.	*j-j*—Hydraulic cylinders.	*s-s*—Pressure gauges.
d-d—Bat-former aprons.	*k-k*—Pressure column.	*u*—Swinging chute.
e-e—Compression rolls.	*l*—Press pulley.	*w-w*—Guides for belt idler
f-f-f-f—Baling rolls.	*m*—Bat-former pulley.	*N-N*—Pressure regulators.
g-g—Cores.		

Between 1840 and 1850 two other forms of pressing cotton were invented one of which had a circular tube with a revolving head containing a number of cone rollers placed parallel to each other with a narrow space between. As the head containing the rollers revolved, the cotton was intended to feed between them, but the inventor failed to notice that, as one side of the roller rotated inwardly, the other side of it must necessarily rotate outwardly, thus preventing any drawing-in action on the cotton. As several other inventors have, within a few years, tried the same scheme with like



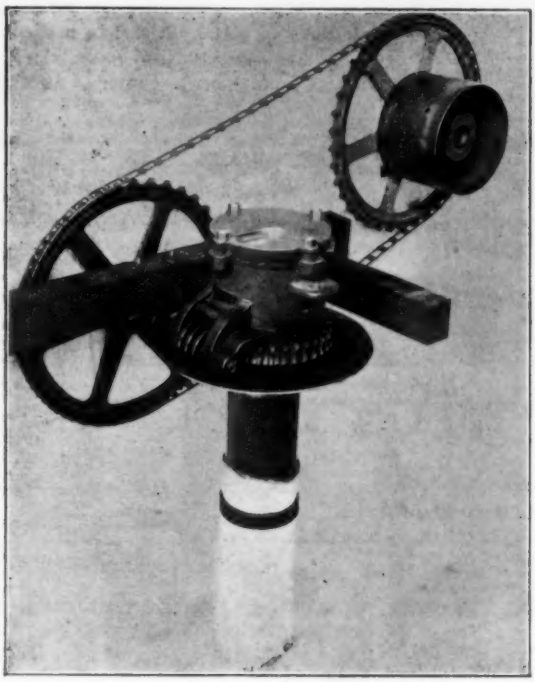
results, the prior inventor (if still alive) need not feel humiliated at his want of foresight.

The other form refered to, was twisting the cotton into a thick rope and colling it on a spindle; this needs no comment.

During the past ten years efforts have been made by several inventors to pass cotton between metal rollers held tightly together, and have the rolls move reciprocally over the receiving box, or the receiving box move reciprocally under the rolls, thus folding the cotton into layers; the box in either case having a screw or hydraulic mechanism attched thereto to compress the layers of cotton. The greatest difficulty found with this style of machine has been to pass cotton between metal rollers without injury to the fibre

The latest distinct form of press is that shown herewith, known as the Lowry Compress. This press is somewhat of a mechanical problem, and the attention of the Society, with a view to solving the principle involved, is particularly requested, as its application to a useful art is entirely new, and possibly capable of being much extended. The press consists of an inner sleeve, 19 inches inside diameter at the top, and drawn in to 18 inches in the first 12 inches of length. This sleeve has a collar, or flange, and revolves on anti-friction bearings, on the shoulders of the stationary outer casing. Bolted to this outer casing is a slotted cap plate. The slots are one-half inch wide, and run radially from within an inch of the center to the outer diameter of the sleeve. Eight slots are used on the present machine. On the inner sleeve is mounted a spur gear, by which the sleeve is made to revolve and a drawn steel tube, to carry the bag for the reception of the cotton, is attached to the sleeve by a flange. In operation, the sleeve is first filled with cotton, sufficiently tight to give some pressure against the cap plate; the cotton, as it comes from the gins and condenser, falls on the cap plate, and some of the fibres become engaged with the cotton moving underneath the slots. These fibres draw in other fibres, with which they are interlaced, and in this way the whole body of cot-

ton on the cap plate is soon engaged and kept moving towards the slots. As the cotton is drawn around the lips of the slots, the upward pressure of the material in the sleeve squeezes out the air and compresses the fibres, and there is no opportunity for re-expansion; this continuous introduction of new material forces the material already in the chamber downward. The narrowing of the diameter, or otherwise the choke in the sleeve, together with the length of the tube gives the resistance which regulates the density of the bale. To give a greater or lesser density the choke is increased or decreased, and the tube lengthened or shortened. With this machine, and an exertion of 25 horse-power, cotton has been compressed to a density of 86 pounds per cubic foot. (Oak is but 54 pounds to the cubic foot.) But in practice, the bales are only made to a density of 50 pounds per cubic foot, as that is sufficient for the full utilization of any shipping space. By taking in a very thin bat of cotton, only a small amount of pressure is needed to compress it to the required density; the large compresses find it necessary to obtain a pressure of 2,800 pounds to the square inch to compress a full sized bale to 22 pounds density, and the American Cotton Company, with a thicker bat require 1,000 pounds pressure to obtain a density of 30 pounds, while with this thin bat only 60 pounds pressure to the square inch is required to compress the cotton to a density of 50 lbs. to the cubic foot.



THE LOWRY PRESS.

At the inception of this machine it was deemed impossible, by those consulted, to obtain enough frictional resistance in a construction such as this on yielding material like cotton, to obtain any amount of density, and the first machine was made with 3 inches of choke in 24 inches of length, the chamber being 16 inches diameter at the bottom, and 19 at the top. The first two bales came through, but the third had become so very solid that it could not be moved, and it finally pushed off the cap plate, stripping the thread from the bolts.

I am of the opinion that the resistance is created by the cotton forming an arch, or bridge, using the sides of the sleeve as an abutment.

The machines of this type in operation have a capacity of about 2,000 pounds per hour, running at a speed of 14 revolutions per minute, and make bales built up of spiral layers, which, when opened, spring apart, thus saving much labor at the mills, and facilitating mixing of the cotton.

As will be seen from the construction of this machine it is inexpensive to build, and will easily come within the reach of the planters and ginners, thus doing away with the re-compressing and re-handling of cotton now made necessary by present methods, and will fully utilize the carrying capacity of ships and cars.

THE LOWRY BALE OPENED.

Cotton Spinners Combine.

The Fine Cotton Spinners and Doublers' Association, Ltd., England, has been registered with a capital of $20,000,000 in $5.00 shares—one-half of which are 5 per cent. cumulative preference shares, and $10,000,000 of 4 per cent. debenture stock. The issue was in the early part of May, and was looked for with much interest in the manufacturing centres. Of the total capital issued the vendors took one-third and the public were offered two-thirds, in accordance with the requirements of the Stock Exchange in the case of companies officially quoted.

This indication of confidence together with the fact that there was no underwriting or promotion money paid, shows the promotion was regarded as a thoroughly sound one. The directors—executive and otherwise—are all practical members of the amalgamating firms, who do a business which is looked upon to be the pick of the cotton trade and in which an established connection and reputation for good work is indispensable. The spinning concerns who form part of the Association, are practically the whole of the Lancashire firms manipulating Sea Island cotton, in producing yarns of the average counts of 120's and upwards. Indeed, several of the combining concerns spin up to 350's counts.

Moreover, of the four main kinds of raw cotton—viz., Sea Island, Egyptian, American, and Indian—the first named is far and away the finest and choicest staple. "Sea Island" is grown on the sandy islands lying off the coasts of South Carolina and Georgia and to some extent, also on the mainland of this southern portion of the United States. These plantations practically border the Gulf Stream, breezes from which are held to impart strength to the fibre of the cotton. Moreover, its staple is very much longer and finer than in the case of the other descriptions named, not even excluding Egyptian; and the combined firms who handle this highly-prized variety of the raw material use the most scientific and expensive machinery in the trade.

Before spinning, the yarn is made additionally clean by a process styled combing. This yarn is used for the

weaving of fine muslins, cambrics, and other choice cloths. For other important purposes, however, the yarn requires to be doubled, and this brings us to the second section of the combination—the doublers. Here again, it includes, with few exceptions, the whole of the trade from Bolton to Nottingham and Derby. The operation of the doubler is to twist two strands of the original yarn together, and the yarn is then styled two-fold. "Two-fold" yarns are used for lace-making, for threads, and for the warp of many fine descriptions and expensive cloths, union as well as cotton. As the finer descriptions of these yarns are not produced by foreign competitors, the Continent is a great market for the yarns turned out by the combining firms. Buyers of such high-class yarns have to be sure that they are getting the right article, as the fabrics into which it enters are so expensive, and the manufacturers do not care to risk using unproved yarns. Hence the special value of the businesses which have been combined by this important Association—all of which are established in the market, and are proved to be profitable from the fact that they have been taken over at a price based upon their profit-earning capacity.

Cotton in China.

The United States consul at Shanghai writes to the State Department, that no one can tell the annual production of cotton in China with any degree of accuracy. There are no statistics, either national or provincial, on such subjects. It is estimated that the annual crop in the vicinity and tributary to Shanghai for the use of mills and for export is 160,000,000 pounds. Probably other parts of China produce three times this amount, making a grand total of, say, 666,000,000 pounds. This is only guesswork, however.

Very little cotton is imported. The Shanghai mills at one time tried a few bales of Indian cotton as an experiment. It was not satisfactory, being both dirty and of a poor quality of fibre. During the last two years, a few bales of American cotton have been imported and experimented with in the Shanghai mills. While it is not so white, its fibre is longer, and hence it will make a finer yarn than the Chinese cotton. The home demand however, is for coarse yarn—No. 20 and coarser.

About 420,000 spindles are working in Shanghai and vicinity. Of these, 35,000 have been working eight to ten years; the remainder have been put in since the Japanese war. It is understood that 50,000 new spindles will be

GIRLS IN CHINESE COTTON MILL.

put in one of the Shanghai mills shortly. No new mills are building. Eighty thousand spindles are working at Wuchang; of these 30,000 have been in operation for about eight years, the remainder one year.

The prospect of a market for American cotton depends entirely on the price at which it can be laid down here. At the present moment the price for native cotton is high. Growers and dealers are holding back the crop, on the theory that the mills must use the Chinese cotton. Practically, the crop is "cornered." There have been paid for cotton delivered at the Shanghai mills $10.65 gold per 133 1/3 pounds. It has been sold as low as $7.00. The average price for the last three years has been $8.00.

American cotton may, after its superiority is fully demonstrated, bring 62 cents to $1.24 per 133 1/3 pounds more than the Chinese product; but, until the natural prejudice in favor of the home product is overcome, it is not safe to ask more than the price of Chinese cotton.

In the mills here the average wage is 10.6 to 13.3 cents (United States) per day, and two-thirds of the employees are women. It is not to be assumed, however, that production is cheap in proportion to the low wages. One American will attend to as much machinery as three Chinese. Nor will the native workmen push machinery as we do. They are careless as well, and much time and money are lost in repairs. While the hours of work are long, the Chinese do not work consecutively and steadily. I might say without much exaggeration that a working day in China is divided equally between work, singing, gossiping, and eating. The small-footed women, when employed in factories, must sit down often to rest their maimed feet. The larger footed women working with them demand equal rest. Altogether, the lot of an energetic foreigner who has charge of a Chinese factory is not a happy one, and the cost of production is not cheap in proportion to the day's wages.

CHINESE GINNING AND SPINNING COTTON.

The Shanghai Cotton Industry.

Recent political events in the Far East have had the effect of directing attention once more to the present position and prospects of the cotton manufacturing industry of Shanghai. From some recently-published statistics it appears that there are now nine mills working in Shanghai proper and six more at places in the interior. According to the Textile Manufacturer, Manchester, Eng., the total number of spindles at work in the fifteen mills is 304,240, but when the extensions contemplated are completed there will be 457,000 spindles at work. In the case of one of the principal mills, 25,000 of the spindles work day and night, but the concern is still unable to meet the heavy demand for their yarn. For

working 100,000 spindles, the promoters estimate an outlay of $1,473,750 on building and machinery. The directors of this mill at their last meeting proposed to declare a dividend of from 7 to 8 per cent. for the current year. Another of the large mills work night and day with 40,000 spindles. Its directors, at their last meetin, declared a dividend of 3½ per cent. for six months.

As regards raw material, most of the mills in Shanghai use Chinese cotton. As an experiment, for a short time some of the mills had tried Indian cotton mixed with Chinese, but not finding it advantageous they had to resort to the use of the pure Chinese variety. In color, Chinese cotton is equal to any of the Indian varieties, and resembles Surat, but the staple is short. Most of the mills spin from 10's to 16's. No mill in China now uses Indian cotton, the Chinese preferring yarn produced in their own country to that imported from India and Japan, because the former is quite free from dirt, and is superior in color to Indian or Japanese. Most of the mills use Japanese coal, but of late this has risen considerably in price, and Australian coal, which is relatively cheaper, is now being imported. Only two mills in Shanghai manufacture cloth. One has 750 looms, out of which only seventy are working, and the other works with 200. They both produce shirtings and drills; but of late, America having imported a large stock of these, the demand for home-made cloth has decreased, and the mills have almost stopped manufacturing cloth. At first, it was the intention of the Chinese government to levy an excise duty of 10 per cent. on yarns and cloth produced by mills under foreign management, but the idea was abandoned at the representation of the foreign ministers to the Chinese government. The foreigners pointed out that it would be a great hardship to them if they were obliged to compete under such discouraging circumstances with yarn imported from Japan and India. They further represented that this protective duty would drain the wealth of China to foreign ports without doing any good to the country. This had the desired effect, and the Chinese government has now equalized the duty levied on imported yarn and cloth and the same manufactured in China.

Cost of Production in Cotton Mills.

ECONOMY IN POWER.

Editor Textile World:

I have recently returned from a trip in the Southern States where I have examined a number of southern cotton mills and obtained the cost of producing a pound of yarn in that part of the country.

I did not find that, even with the cheaper price paid per capita and the lengthy hours, this cost for mill labor alone was much less than here in the North. The cost for power, on the other hand, in most of the southern districts, is less, owing to the cheaper cost of the coal, although in many instances the cost of power per pound of cloth or yarn produced as a whole is nearly as high as in the North, owing to the insufficient manner in which the fuel is burned and the power generated and transmitted.

This brings me to the principal point which I wish to make in this article which is that the remedy for the lack of profit in most of our Northern factories today is in reducing the cost of their power and not in the reduction of wages. The remedy proposed, that of reducing the cost of power both in generation and transmission, can be accomplished by the Northern mills and can not be by the Southern mills for the simple reason that the latter cannot get the money at any reasonable rate to pay for the changes.

Most of the Northern manufacturers might deny that there can be any great saving made in the cost of power. Taking, however, actual figures, a steam plant installed in 1870 cost $70 per indicated h. p., and the operation of this plant cost $38.14 per

indicated h. p., coal being $7.10 a ton at that time. Substituting in this same plant the difference in the cost of coal at the present time, say $3.85 per ton, and our figures for operation would be $28.99 as the cost per annum of a steam h. p. in a large yarn mill of 1000 h. p.

Now at the present time a modern steam plant can be installed for $57.00 per h. p., and taking coal at the same rate we have a total operating cost of $17.84 per h. p., showing in twenty-seven years a saving in first cost of 18.6% and a saving in operation of 39%.

Taking a mill or other manufacturing plant with a capital stock of $1,000,000.00, which, on the basis of a cotton mill would require about 2000 h. p., the saving in power between the first and the second cost given above would be 2.23% on this capital stock. Recent figures have brought this cost per h. p. down to $12.00. This would represent a saving of 3% of the capital stock over the same plant in 1870.

Actual data from a still more recent mill shows that the total cost per h. p. has been reduced to $11.08 per h. p. for power alone. The cost of coal in this instance was $1.76 per ton. This would show a saving of 3.6% on the capital stock over the same plant in 1870.

All of these figures include coal, labor, supplies and repairs, interest at 5%, depreciation at 5%, taxes about 1% and insurance at about ½%.

The loss in power by transmission in some of our manufacturing establishments is very high, the largest loss being probably in iron working establishments, where as high as 80% has been known to be consumed, in wood working establishments 40%, and in cotton mills, which are the most economical in transmission, as high as 27% has been consumed. There is no substantial reason why the total loss in transmission of power should exceed 15% to 18%, and I have some figures and actual tests made by myself which are below these amounts.

The other item of most importance in all manufacturing concerns is the doing away as much as possible with unskilled labor. It is an actual fact, that the loss in the unloading and firing of coal by hand, with the removal of the consequent ashes, the unloading of raw material and the loading of the finished product again by hand, can be very largely saved and that it alone would represent a very fair dividend upon the capital stock of the concern.

To any one vitally interested in these statements I can give facts and figures to substantiate the statements I have made.

WM. O. WEBBER,
Consulting Engineer.

Boston, Mass, May 25, 1898.

Cotton Market.

We quote middling uplands at present writing at 6 7/16 cents, which is the same as that of last month. It is too early in the season to have much to say regarding the growing crop. The recent appearance of warm, clear weather throughout the cotton belt, accompanied by showers, except in certain portions of southern Alabama and Georgia, is promising for a full crop. The opinion in the trade is that the acreage is about the same as that of last year, though possibly two to three per cent. less, but not 6.6 less, as indicated by the recent crop report of the Department of Agriculture. According to this report, the decrease in the probable area of planting, compared with that of 1897, ranges from 92 per cent. in Texas and Arkansas, to 97 per cent. in Alabama. It is impossible to predict at this time the probable range of prices for cotton, but there is nothing to indicate a higher range as spinners throughout the world have a larger stock on hand than any previous year at this time, with manufacturing far from active. There is a surplus, as near as it can be estimated, of nearly 1,500,000 bales of American cotton. A cotton crop of over eleven million bales is now assured for the season of 1897-98. According to the monthly cotton report

of Ellison & Co., the cotton business in Russia is good, though better for spinners than for weavers, in that spinners are under contract for many months to come. The consumption of East Indian cotton is now replaced by Central Asian. On the whole, neither the cotton spinners nor the manufacturers are doing more than a normal business on the Continent. An interesting letter has been published by Fr. Jac. Andres, Boston, from his son, who is now in Egypt, which reads as follows:

"After the unreasonable advance of the last ten days, the market is slowly declining, and values show a reaction of six piastres from the highest point, and, as expressed in my today's cable, I expect a further moderate decline. The market is heavily oversold. Planters complain about scarcity of water for irrigation, and it is feared that serious damage may result to the growing crop during July and August. My own investigations show a lack of water in some districts, but serious apprehensions are not yet felt. Only one gin is still running at Zagazig.

"The 'Kafr-El-Zayat' ginning establishment of the 'Anglo,' as well as all others, are closed. The heat is almost unbearable, and most Europeans have already left Egypt.

"The famous cotton market Minet-El-Bassal, is very interesting, and everybody much excited about the war which had just been declared. On the train from Alexandria to Zagazig, six hours' railroad travel, I had an excellent opportunity to form an idea of the cotton fields. From horizon to horizon the country is perfectly level; the rich, black soil is laid out systematically in 'feddans' (acres), separated by canals and ditches which furnish the Nile water and give the lands fertility. Already the cotton plants have obtained a height of about six inches, and are strong and healthy, although backward. Most of the lands are 'cotton;' here and there 'grain' and other cereals. In the fields the Arabs are working like beavers, despite the hot sun. These Arabs are intelligent and hard workers. Their wages are almost nothing, but their requirements are small. However, they seem happy and well contented. They are superior to our Southern negroes. The villages through which we pass are crowded with the inhabitants, who offer their wares to the passengers. These Arabs, with their turbans and colored garments, present a very picturesque appearance—the bright clear sky overhead, the beautiful palm trees and oriental vegetation —all is striking to the stranger's eye.

"Zagazig, the capital of the district 'Charkieh,' one of the most prominent districts for cotton, has about thirty thousand inhabitants. The greater part of the cotton from Charkieh, about one-sixth of the crop, or one million cantars, which this district produces, is brought to this place to the large ginning establishments of which there are about six. I may say that the cotton from Charkieh (the best of which comes from Moralieh), is of the current quality, Fully Good-fair, and is noted for even running and good staple, and well adapted for hosiery work. I had occasion to see one of the largest of these ginning establishments in operation. A one-story structure, built of brick and cement, reminded me of a card room. On each side are arrayed, in rows, the gins, numbering one hundred, of Platt Bros. & Co., Oldham, England, 1869 and 1889. These are mostly used, and are very well adapted for the cotton. They are constructed to avoid damaging the staple, and more importance is given to this than to the production. As the cotton comes cleaned from the gins, it is taken to the 'Fanfarrah,' where all dust and leaf is taken out. It is then at once packed in steam-pressed bales, marked, and is ready for export. All through the operation the greatest pains are taken to avoid injuring the quality. The seed is put into cleaners and some of it re-ginned; the cotton from this is low grade, called 'Affridis,' similar to our linters, but inferior. The seed goes direct to the oil mill, which forms part of the establishment. A mill of about one hundred gins produces about 110,000

to 200,000 cantars during the season, —1,400 pounds per day per gin.

"The employees number about 300, and are mostly Arabs—child labor. The wages are about 4p. or 10c. per day, and the hours are from 6 a. m. to 10 p. m. During the summer these mills close, but during the season they often run night and day. The value of such an establishment is about £25,000.

"The cotton firms here are mostly branches of Alexandria export houses. They buy the cotton from the surrounding Arab villages, one of which I had occasion to visit. Although exceedingly hot, we rode on horseback the distance in two hours to the village 'Ibralinnir,' of about 7,000 inhabitants. Some of the wealthiest Arabs (planters) reside there. All these people take pride in the quality of their cotton; and one can easily see why Egyptian is so even running and superior to our American cotton."

The reports from Peru are to the effect that there has been no rain in the Piura district, and that the production of rough cotton this and next year will be very small.

Wool Market.

There is nothing particularly encouraging in the wool market, though prices have weakened but little, and owners manifest a faith in present values and in the early future wants of manufacturers. Wools that are in demand for army goods are disposed of at full values, and especially is this true of wool that is wanted for bunting from which to make flags. There is nothing, however, in wool manufacturing to create the least show of activity, except as above indicated, in such mills as are supplied with government contracts. Prices are looked upon as being relatively low, compared with those existing in foreign markets. As near as we can learn, there are more consignments of Territory wools this year than last, due to the fact that buyers are not willing to pay the prices asked at the points of shipment. The consignments, of course, are made in anticipation of realizing relatively good prices. Notwithstanding the present state of depression in the manufacturing circles, the outlook is regarded with much favor as being excellent for the coming season. There is no question that fabrics are at a comparatively low price, and if there is any sort of a demand for them, values will have to advance. Ohio, XX and above wool is commanding an average of 29 cents, with delaine staple at one-half to one cent higher. The X grade is quoted at two to three cents below XX. Territory wools of good staple may be quoted at about 48 cents clean, which is from five to seven cents lower than was the case last fall. In the London market, Australian merino wool, best quality, is bringing 20 to 24 cents per pound, and this quotation is firmly adhered to. Even crossbred grades are in good demand, at full prices. Our latest advices from England represent the situation in the woolen industries as improved slightly, as regards the home trade, but the serious falling off in the export of goods for the first three months of this year causes a general slackness of work among manufacturers.

—Modern inventions, the introduction of mungo and shoddy, and the tendency of the trade, have all been in the direction of deterioration, till counterfeit and shoddy have become a science. Of course, it would be folly to assert that pure and superior cloths are no longer made, but for one piece of that class, probably fifty pieces inferior or counterfeit are produced. It is a case of supply and demand, and the demand rules the market. By the aid of the slubbing billy and the hand mule princely fortunes were made, and the high-class goods of the West of England attained a pre-eminence which has never been excelled. Carr's meltons, Marling's beavers, and Bliss's tweeds were household words, which gratified the most fastidious taste, and as regards durability one might literally assert that they were never worn out.

COTTON DEPARTMENT.

23190 apr. 11.98.

American Cotton Spinning Machinery.

CHARLES CLIFTON HEDRICK.

ARTICLE III.

(Copyright.)

A sectional elevation of a cotton mill is shown in Fig. 11, which is very similar to the one previously shown in Fig. 1, with this arrangement, which is also a three beater system, the horizontal cleaning trunk is dispensed with and an inclined trunk used in its place. One end of this trunk is connected to an opener, on the first floor, the other end to a one beater breaker picker, with a screen section, on the second floor. The distance between the opener and breaker is short and does not require a condenser and gauge box to receive the cotton, otherwise the machinery, used in this system, is exactly the same as that in Fig. 1. The inclined cleaning trunk is used quite extensively in preference to the horizontal one as the length of grid, or cleaning surface, is considered by many to be sufficient for the removal of nearly all of the loose dirt and leaf, and the cleaning of this style of trunk can be very quickly performed.

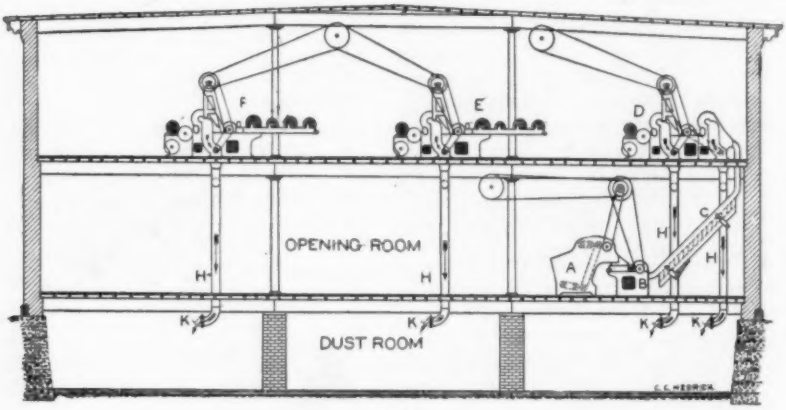


FIG. 11.

Fig. 12 shows a section of an inclined trunk with the pockets closed, as when the machines are running. It is suspended from the floor above by rods "R" in the same manner as in the horizontal trunk and consists of two parts, the top passage "C" through which the cotton passes from the opener to the breaker and the pockets "D" which receive the dirt and leaf which fall out of the cotton. The top passage is provided with an automatic sprinkler "S" in case of fire. The pockets are separated from the passage by the grid surface which consists of a series of flat iron slats, placed edgewise and running across the trunk at right angles to the direction of the cotton in transit through it. As the cotton is drawn along by the air draught, each slat presents a narrow surface, against which the cotton strikes, causing the dirt to be shaken out and to fall down between them into the pockets beneath.

The bottom "E" of the pockets is made in one piece, extending the whole length of the trunk, and is held up against the underside of them by levers "G" which are fastened at each end of the bottom to a strip which runs along the underside. These levers are controlled by a han-

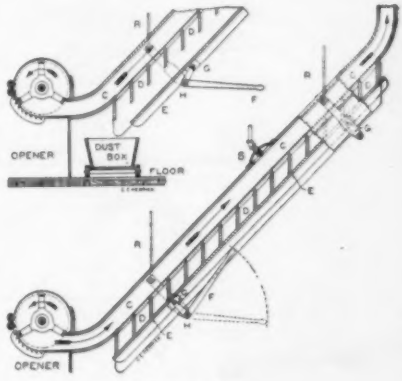
dle "F" which is connected to the lever by a shaft "H" the bottom forming a connection to the upper lever.

Fig. 13 shows a trunk with the pockets opened for cleaning. The handle is swung down into the position shown which draws the bottom away from the underside of the pockets. The dirt and refuse slide down into a box, or basket, placed beneath the lower end of the trunk. Sometimes the trunk is provided with a connection by which the dust is allowed to fall directly into the dust room.

Fig. 14 shows a section of the breaker picker. The cotton enters from the trunk "C" and is deposited upon two slowly revolving screens, or cages, "A" and "B". These cages form what is called the screen section of the breaker and are simply for the purpose of cleaning the cotton and forming it into a condensed sheet to be fed to the beater. As the distance traversed by the cotton, between the opener and breaker, is short what little cotton there might be in the trunk would not materially effect the weight of the laps by the stopping of the feed of the opener, while doffing the breaker, and this may be entirely overcome by doffing without stopping the feed. Each screen is provided with an opening "D" at each end, which leads into a dust passage "E". The fine particles of dust and lint pass through the perforations in the screens and out the openings at the ends and down the dust passage to the fan "F" by which they are forced through the pipe "H" into the dust room. As the screens revolve, the cotton, which is deposited upon their surfaces, is carried around to the stripping rolls "L" and "M" and removed by them. Passing forward between the feed rolls "P" and "R" it comes into contact with the blades of the rigid beater "T". From this point the cotton undergoes the same treatment as in the machines previously described.

Fig. 15 shows a sectional elevation of a three-story mill also arranged with a three beater system. The openers and feeders are placed on the first floor and connected by a horizontal cleaning trunk, the breaker being fitted with a condenser and guage box which provides for the long distance, traversed by the cotton.

The second floor is used for opening and mixing the cotton after which it is dropped down, through a chute, to the feeders on the floor below. It will be seen that the fan for cleaning the trunk is upon brackets which are fastened to the wall on the end of the trunk, nearest the opener, instead of the opposite end, as in the first arrangement shown. (Fig. 1) Sometimes



FIGS. 12 AND 13.

only a part of the second floor is used for opening and mixing, while often the first floor is used for this purpose and the second floor devoted to some other process.

Another way of arranging this system is to divide the first floor into sections leaving only a small space around the feeders for the cotton, the rest of the floor being used as a repair shop.

When the pipes leading to the dust room pass down through the rooms below, it is customary, usually, to bring them down near the side walls, or some of the columns, in order that they shall be out of the way as much as possible.

Fig. 16 shows an arrangement with all of the machinery on one floor, as when space is limited, and the cotton is opened and made into a finished lap

on the same floor as the card room. With this arrangement no cleaning trunk is used. The machinery consists of a two beater breaker, with an automatic feeder, the first section of the breaker corresponding to the opener, which is shown in the arrangement with the trunk system. The rest of the machinery is a single-beater intermediate picker with an evener, a single beater finisher picker, also with an evener and a carding beater. Any of these single beater machines can be made with two or three beaters when

breaker picker and a single-beater finisher picker with an evener and rigid beater.

In all of the arrangements previously described, the carding beater has been recommended for the finisher picker, as giving the best results, but, for the treatment of very long staple cotton the rigid beater is used in preference as the action of the carding beater is considered too harsh.

It frequently happens that the cotton bales cannot be unloaded near the opening room, when this is the case

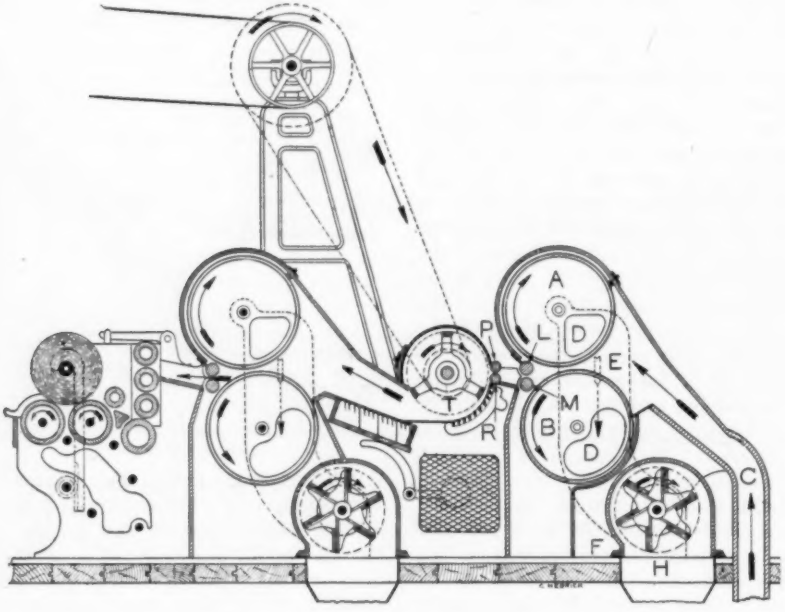


FIG. 14.

the nature of the cotton requires a very thorough cleaning and the floor space is limited.

For spinning fine numbers of yarn, which require long staple cotton, the fibres must be treated as carefully as possible, and, as the opening and cleaning process is an unavoidable evil, it is necessary to reduce the beaters in a system to the least number possible. Fig. 17 shows this system which consists of an automatic feeder, usually provided with an evener, connected to a single-beater

an additional handling of the bales is necessary, which is quite an item of expense, particularly in a large mill. An improved method, one which has been adopted by some of the leading manufacturers, is to connect the opening room with the cotton house (where the bales are unloaded) by a galvanized iron pipe, twelve to twenty-four inches in diameter. This pipe may be of any reasonable length some of them being over six hundred feet long.

In the cotton house is an automatic

feeder which is connected to one end of the pipe. The cotton is thrown into the feeder, which delivers it to the pipe, through which it is drawn by a strong current of air, produced by an exhaust fan which is usually placed about half way between the ends. This fan has a style of wheel known as a wool wheel which is used for blowing wool.

The other end of the pipe is provided with a condenser which consists of a revolving screen, about twenty-four inches in diameter, upon which the cotton is deposited. The screen is connected to a fan and, being open at both ends, the light lint and dust pass through, while the cotton is removed, as the screen revolves, and falls in a pile upon the floor.

This system of blowing cotton permits of a large amount being handled in a day, from 16,000 to 20,000 pounds per day being considered an average from one feeder.

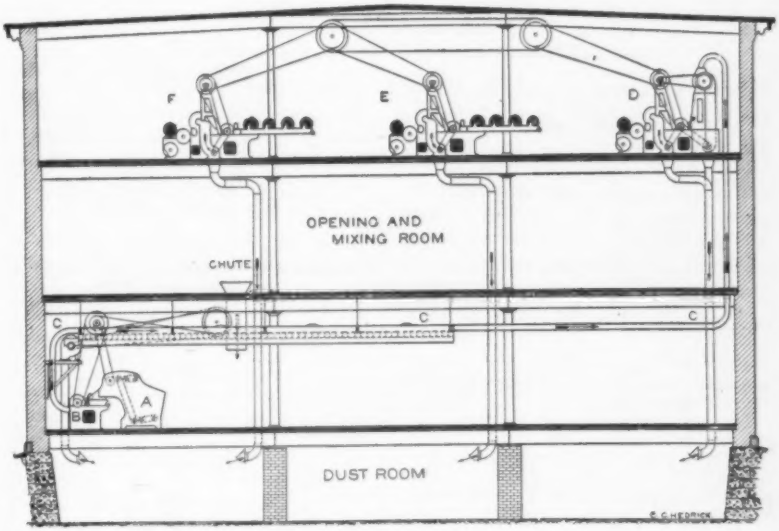


FIG. 15.

—The expression "factory" means any premises where steam, water or other mechanical power is used in aid of any manufacturing process there caried on.—Mass. Statute.

European Cotton Spindles.

The Bremen Cotton Exchange has published the following particulars of the number of spindles in existence in Germany, Austria, Russian-Poland, Switzerland, Holland, and Belgium:—

Germany.	1887.	1892.	1898.
Alsace	1,375,000	1,400,000	1,597,848
Baden	398,172	388,384	429,786
Wurtemburg	354,548	435,185	545,271
Bavaria	924,312	1,146,636	1,390,558
Saxony	541,122	724,217	1,101,662
Prussia	984,194	1,344,666	2,030,377
Oldenburg	17,000	21,500	20,000
Total	4,594,348	5,461,288	7,115,509
Austria	2,070,363	2,707,762	3,140,171
Poland	448,000	604,504	784,570
Switzerland	1,711,300	1,731,198	1,709,400
Holland	245,308	249,274	269,680
Belgium	605,000	734,100	880,900
Total	9,674,319	11,488,122	13,900,130

There were besides, in 1887 (worked in connection with cotton), 460,447 Spanish wool spindles in Saxony, against 575,210 in 1892, and 762,205 in 1898; and 59,680 in Poland in 1887, against 62,560 in 1892 and 170,980 in 1898.

—We are told that only in checked fabrics were Greek and Roman warps multi-colored, "for stripes were obtained by changing at regular intervals the color of the woof."

What Can be Saved by Revamping Mills Having Old Machinery?

M. Campbell, general manager of the Woonsocket Machine & Press Co., Woonsocket, R. I., made the following statement at the recent annual meeting of the New England Cotton Manufacturers' Association. It is well worth dissemination, and should be carefully considered by mill agents and treasurers:

The cost per pound in producing cotton goods is a question that largely interests every person connected with its manufacture, and how to reduce the cost, and what will reduce it and how much, are the questions first talked over. Below is given the cost sheet of a mill that was revamped. In 1895 it was working with old, and in 1898 with new machinery. Attention is called to the fact that there is 11 per cent. allowance made on price of labor in favor of the year 1895, so as to bring the cost to an equal price and not to show too radical an improvement, when part of it was due to cut-down in price of labor. This mill makes on an average 31.50 yarns from about a 4.25 hank roving.

It will be noted that the actual saving in labor was 1.76 cents per pound or about 20 per cent.

Following this will be found figures given by another mill where only the fly frames were put in new. For two years the treasurer of this company questioned if it would be a paying investment for him to throw out his old frames, as he could not save anything by having less help in his card room, but today he only wonders that he delayed the matter so long.

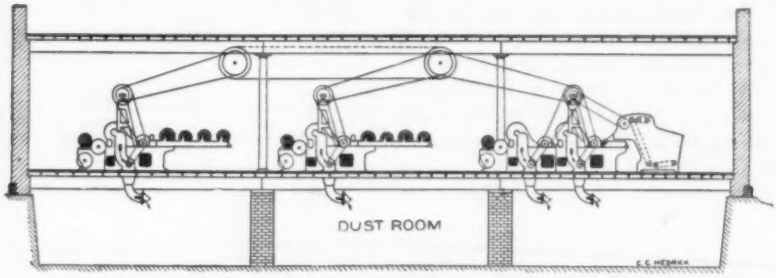


FIG. 16. AMERICAN COTTON SPINNING MACHINERY. PAGE 57.

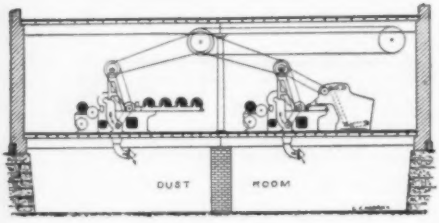


FIG. 17. AMERICAN COTTON SPINNING MACHINERY. PAGE 58.

Comparative Costs, No. 1 Mill, Periods in 1895 and 1898.

Labor Cost per Pound.			Supplies Per Lb.		Total Per Lb.	
	1895	1898	1895	1898	1895	1898
Carding	.810	.596	.180	.052	.990	.648
Spinning	1.257	1.046	.242	.168	1.499	1.214
Slashing	.571	.499	.396	.259	.967	.758
Weaving	3.303	2.646	.378	.453	3.681	3.099
Power	.044	.142	.381	.289	.425	.431
Cloth room	.131	.159	.037	.037	.168	.196
Lighting	.016	.000	.038	.021	.054	.021
Miscellaneous	.032	.013	.798	.258	.830	.271
Office & Supt.	1.022	.763	.000	.006	1.022	.769

The total cost for everything was for 1895 ..... 8.75 cts.
The total cost for everything was for 1898 ..... 6.99 cts.
—— $1.76

OLD PRODUCTION.	NEW PRODUCTION.
12,500—58 hours.	14,000—58 hours.
Hank roving, 4.16.	New, 4.70.
Card room cost, 1.$\frac{1}{16}$.	Card room cost, .94.
Number of yarn, 28.	Number of yarn, .30.

Breaking strain showed a gain of 12 per cent. The above figures show a fair comparison of what may be done by changing over old mills, and it is only a wonder that the matter is taken hold of so slowly.

Mechanism of a Fine Spinning Mule.

WILLIAM SCOTT TAGGART.

(Continued from April.)

In regard to the special arrangement for "drawing-up" and "backing-off" the two illustrations, Fig. 5 and Fig. 6, show the difference between ordinary and fine spinning mules.

We have already spoken of the extreme gentleness of action required in making the changes, and nowhere is

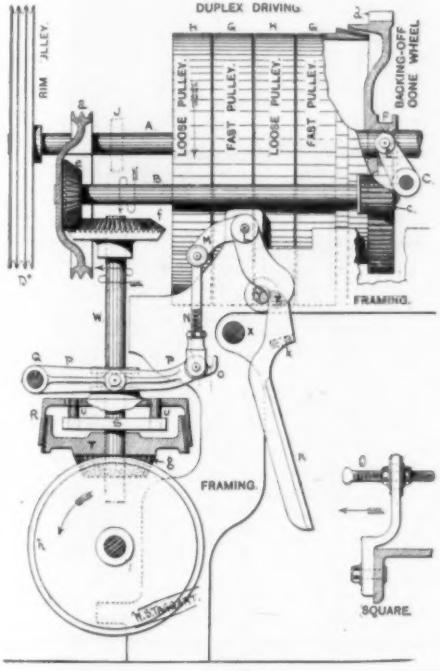


FIG. 5.

this more necessary than in the two operations mentioned above. Reference to Fig. 5 will convey very clearly what we wish to emphasize. In the first place, it will be noticed that the scroll shaft is driven from a band pulley "a" acting through the bevel wheels "e" and "f," the cone clutch "R" and "T," and the bevel wheels "g" and "h." The termination of the inward run is brought about by the screw "O" on the carriage square coming against the pendent lever "K" and through its connections "N" "P," lifting the top part "R" of the cone clutch out of contact with the bottom part "T." It will readily be seen that an action such as this is almost instantaneous, since a cone clutch cannot be made to come out or go into gear gradually. The consequence, heretofore, of this abrupt movement is to cause the drawing-up to be performed too suddenly, with disadvantageous effects on the fine and delicate yarn being spun. This is even more noticeable in the case of backing off, for whilst a slight advantage may be gained, the cone clutch between the wheel "d" and the fast pulley "G" is still retained; so other means are adopted to still further modify the abrupt action of putting "d" into contact with "G."

A still further disadvantage of the arrangement in Fig. 5 remains to be noticed. For the highest quality of work it is absolutely necessary to shorten the stretch. If a correct scroll is made for, say, a 60 inch stretch, it is quite clear that such a scroll will not be exact for a 54 inch stretch. It would be clearly an impracticable arrangement to have to change the scrolls every time the stretch was changed. Fortunately, this is not necessary as a consideration of the purpose of the scrolls will soon show.

The main object of a scroll is to draw up the carriage. Its second object is to do this in such a way that the carriage starts out very gently, attains its maximum speed towards the middle of the stretch, and finishes very gently. Now with a 60 inch scroll on a 54-inch stretch, the whole of the scroll would not be used, therefore, there would be altered conditions of working, and we should not obtain that gentleness of action which is so much required.

To overcome these objections, the arrangement shown in Fig. 6 is adopted. It is exceedingly simple and works admirably. Indeed, a comparison of Fig. 5 and 6 will show that Fig. 6 is far less complicated and considerably more economical.

On reference to the drawing, the ad-

justing screw "M" carried by the carriage square comes into contact with the lever "N," and this working from its fulcrum "P" actuates through the link "Q R" a strap fork lever "R S T," the fulcrum being at "S." The strap fork at "T" guides a strap on to the pulley "B." Fixed to "B" is a bevel wheel "C," which gears into "D" and so drives the scroll shaft "F," thus drawing up the carriage; the carriage screw "M" coming against "N" changes the strap from "B" to the pulley "A" keyed to the shaft "G," by which means the scroll shaft is stopped and the backing-off shaft "G" is set running.

The advantage of the arrangement is seen in the fact that the changing of the strap from "B" to "A" and from "A" to "B" can be brought about gradually, and moreover the speed can even be modified by not using the full width of the pulleys, for which purpose a stop rod and adjusting screw are used.

The next feature to be noticed is the short shapes. The necessity for its use depends entirely upon the shortening of the stretch. Two drawings are given in Figs. 7 and 8, one showing the long shaper, and the other the short shaper.

Fig. 7 is practically self-explanatory. It represents the long shaper and the connections through which the copping faller wire is actuated. Fig. 8 shows the whole mechanism of the short shaper. The faller connections are not drawn in, but since these are exactly as in Fig. 7, there will be no difficulty in understanding the action. The front and back inclines are pretty much as we find them in the long shaper in respect to their size and shape. The chief difference consists in bringing them nearer together, and forming them into one casting, and carrying them on a slide "Q" which is supported by a fixed slide cover "R," bolted to the under side of the carriage square.

On the two inclines rests the shaper rail which is a much shortened replica of the long shaper rail so far as its outline is concerned. In its means for adjustment, however, it differs greatly.

The rail rests upon the inclines by means of the two pins "H" and "B;" the short portion "C F" centered at "C" projects downwards at "D" and rests upon the middle incline "E F." The long portion of the rail "C G H" is centered at "C" also, and rests with its end "H" upon the adjusting screw at "J." At this point adjustments for

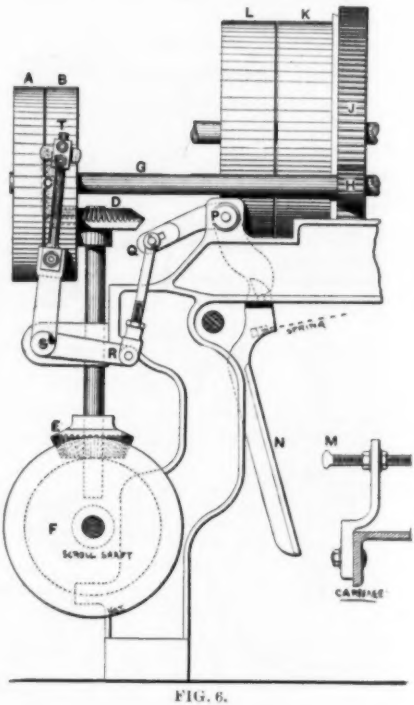


FIG. 6.

length of chase can readily be obtained.

A nut "M" on the front incline engages with a screw carried by the slide "Q," and by this means the inclines cannot move along the slide except as permitted by the screw when actuated through the ratchet wheel "P." The whole arrangement so far as we have described it, is carried by the carriage and naturally would partake of the motion of the carriage, being backwards and forwards. This would have no effect on the faller leg.

What is desired is to cause the shaper rail to move out under the faller leg bowl as the carriage runs in and vice versa. In other words, the shaper must move outwards to the extent of distance 5 to 6 or 7, during the time the carriage performs its full stretch, of, say, 60 inches, when it runs in. This is brought about as follows: On the slide "Q" is fixed a short rack "S," and into this gears a small wheel "T" on the boss of which is a larger wheel "U," both wheels being carried by a bracket from the square. The wheel "V" gears into a long rack fixed to the floor. As the carriage takes the wheels "T" and "U" forward, the fact of "U" gearing into a fixed rack causes "U" to revolve in the direction of the arrow, and the wheel "T," also turning, moves the rack "S" in the opposite direction to the one in which the carriage is moving; in this way we can cause the shaper to slide under the faller leg from 5 to 7, or any other distance required by making the wheels "T" and "U" with the requisite proportion of teeth.

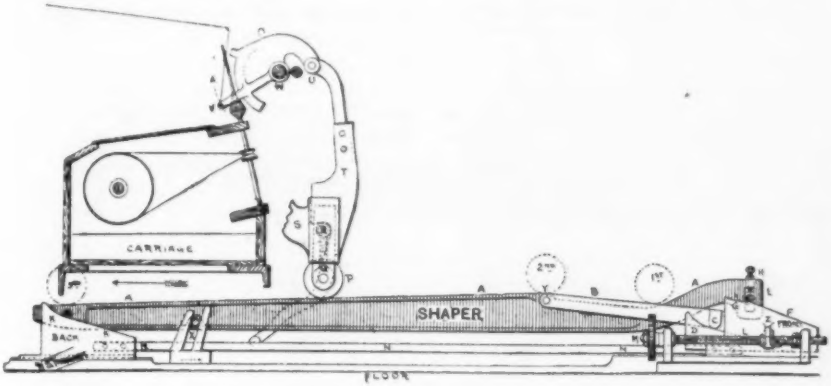


FIG. 7.

One of the small diagrams will illustrate this feature clearly. The other sketch shows how the ratchet wheel is actuated by the finger "Y" coming against an incline "X" on the slide cover "R." The rail is caused to fall vertically by the other end of the pin "B" sliding in a vertical slot as shown. It need scarcely be added that the short shaper has no advantage over the long shaper in the formation of a cop. Its advantage consists in enabling the stretch to be altered, and by altering the wheels "T" and "U" to still use the same length of rail as from 5 to 6 or 7.

Marks are filed on the shaper to facilitate changing from small cops to large cops. When the marks on the pins "A" and "B" are resting on the marks 3 and 8, and the mark at "I" is over the mark on pin "A." A large cop will be made by moving the shaper its full length from 5 to 7.

By moving the pin "A" to the mark "2" and setting the front and back inclines so that the lines 2, "A" and 4 are together, and also the mark 9 directly under the pin "B," then a small cop will be formed by moving the shaper under the faller leg from 5 to 6 The wheels "T" and "U" must also be changed to do this. Any other size of cop between these sizes, can readily be made by setting the marks between these extremes, and altering the wheels to suit, the calculation of which is a simple case of proportion. The short shaper is sometimes found convenient in the case of old mills whose floors yield, since in such cases the carriage and shaper fall to the same extent. The winding motion we are about to describe has been found by some firms to be of material advantage in spinning far

lower numbers than 170s, but in such cases it might almost be considered a luxury; when we come to higher counts, its use is absolutely essential. The reason for its employment may be stated briefly as follows: As the carriage, during the run-in approaches the roller beam, the spindles are revolving at their quickest speed because the quadrant is then making the least horizontal advance, and it is at this stage that the yarn is being wound on the nose of the cop; but directly the carriage stops the spindles stop revolving and the fallers immediately change to the position they are to occupy when spinning is in progress. As the change is made, a certain length of yarn is set free, and unless this is instantly taken up by the spindles, the yarn will form into snarls, under ordinary conditions of working. The changing of the fallers is arranged to take place just as the inward run is being completed; this enables the terminable winding from the quadrant to turn the spindles sufficient to take up all or the greater part of the freed yarn. But this is found difficult to do and all imaginable kinds of snarling motions, etc., are devised to enable changes to be made effectively and without causing snarls. Now in very fine numbers, say 200s, the twist per inch would probably be 51, whilst for, say 70s, it would only be 30, and the difficulties of 70s would therefore be considerably increased in the case of 200s in the immediate formation of snarls during the change of the fallers, and in addition, the difficulty of filling the yarn from such hard-twisted loops in such fine threads, by anti-snarling motions, would be practically unsurmountable. It is under these circumstances that an extra winding motion, exterior to the quadrant, is found to be serviceable in giving a few extra turns to the spindle as the carriage is finishing its inward run.

The action of the motion will be easily understood on reference to the drawing Fig. 9, to appear in the following article.

(To be continued.)

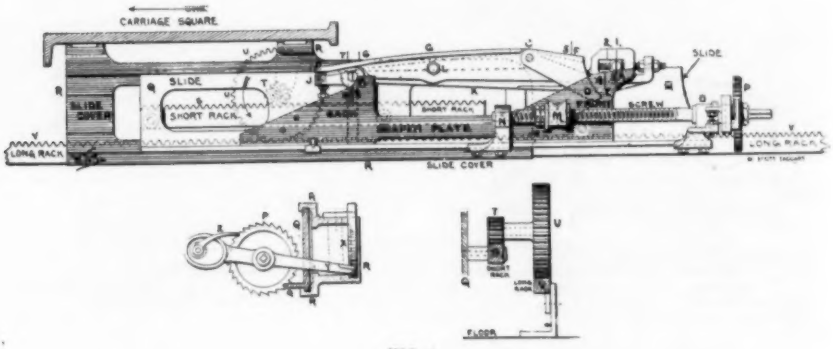


FIG. 8.

—A recent French invention has been before manufacturers in Europe, for polishing woven fabrics. Its object is to give to silk, cotton, or mixtures a certain opacity or shaded effect by causing the peculiar appearance which they present after weaving to disappear, at the same time retaining or improving their touch and appearance. This result is obtained by polishing the fabric in the loose or unstretched condition and placed upon an elastic support. The polishing is effected by means of a series of revolving discs provided with blades and conveniently distributed above this support; but the fabric, being loose, would be drawn along by the movement of these blades if recourse were not had to a special holding contrivance which, by pressing at the desired time upon the fabric, prevents this drawing action.

WOOLEN DEPARTMENT.

Photography in Weaving.

"JAN SZCZEPANIK'S PROCESS.

By Nic. Reiser, Director of the Weaving School, Aachen, Germany.

The writer gives in the following the result of his inquiries into an invention which seems likely to cause an entire revolution of the art of designing, this most essential and up to now most difficult part of the textile industry.

Designing for weaving by the aid of this process, is done by means of photography in such a way that any picture or object, of whatever nature, can be produced in an enlarged scale through an optical obstruction (a screen) directly upon sensitive paper. This screen, which is called "Raster," is a photographical negative about 80 ×80 c/m in size, and is made on a strong glass plate, mounted firmly in a frame. About 30 such Rasters or screens are required to make all designs whatever occurring in the whole of the weaving industries. One of them, called the chief screen (Fig. 1), is a light-gray negative with a strong lineage similar to designing paper, each of the lines consisting of two parallel strokes, one of which is black, the other white. The lineage forms a large number of squares, 800 to 1,000, in the width representing the warp, and an equal number representing the weft-ends. The whole surface of the screen thus contains 640,000 to 1,000,000 squares.

The photographic apparatus (Fig. 2), which is used for designing, has a focusing-screen (Fig. 3) which is also covered with a black fine lineage, and conforms in its scale to that of the chief screen, and all the other screens used. A small picture in front of the lens of the photographic apparatus can very easily be projected in the desired scale on to the focusing-screen in the following manner. The object, if fixed exactly in the centre of the board "B," Fig. 2, is carried in a stand to the front of the camera; then the apparatus is adjusted so that the image covers the desired number of squares in the width of the focusing-screen. The closer the lens is brought to the picture, the larger will be the projected image. At the same time the focusing-screen must be removed from the lens until the image appears sharp enough. In order to reduce the picture, the lens is removed from the picture, and the focusing-screen is advanced to the lens until the image is quite distinct. The stand and camera are connected by two rods fastened to their side, and containing a scale for mechanically finding the enlargement desired. The board "B" can be vertically adjusted by means of a crank; another crank works the horizontal adjustment of the board. The crank arrangement is not shown on Fig. 2. These motions serve the purpose of easily projecting the picture on to the focusing-screen. The focusing-screen contains squares representing the warp and weft ends, in the proportion of 1—1. The other proportions—when more warp than weft ends, or more weft than warp ends are in one square—are usually represented on the designing paper by oblongs of different size. These oblongs are so arranged as to divide the design into the desired number of warp and weft ends, in its length and width. With the present arrangement the squares are not altered, but the image projected on the focusing-screen is shortened or lengthened by optical means, so that the length also is thrown upon the desired number of squares in the length of the focusing-screen, although the width of the

*—Jan Szczepanik, the inventor of the process treated of in this paper, is the same as the inventor of the marvellous Teletroscope. The British patent has been acquired by Macclesfield parties. For further particulars application should be made to the Societe pour des Inventions (Jan Szczepanik et Cie.), iii Ungargasse 12, Vienna.

image remains unaltered. The width, of course, may be arranged in the same manner. The foregoing is effected by a cylindrical mirror (Fig. 4), or cylindrical lenses (Fig. 5), which are arranged between the lens and the image, according to the proportion required between warp and weft ends. For simplifying the adjustment the screw has a scale, which gives all the proportions between warp and weft.

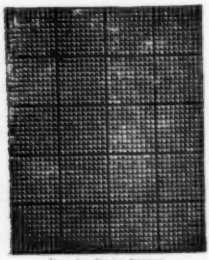


Fig. 1.—Chief Screen

Fig. 4.
Cylindrical Mirror.

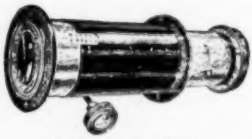


Fig. 5.—Cylindrical Lenses.

Fig. 6.—Dark Slide.

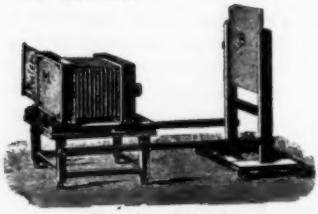


Fig. 2.—Photo. Apparatus.

Fig. 7.

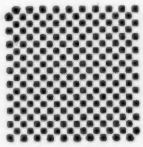
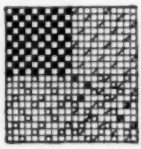


Fig. 8.



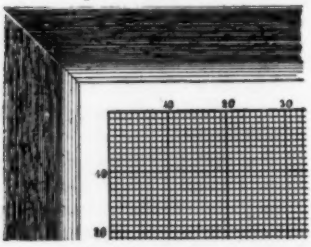


Fig. 3.—Focussing Screen.

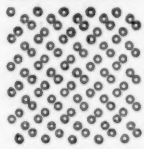


Fig. 9.

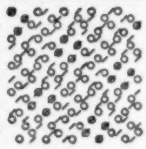


Fig. 10

Fig. 11.

Fig. 12.

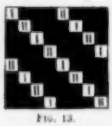


Fig. 13.

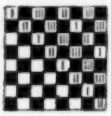


Fig. 14.

Fig. 15.

Fig. 16

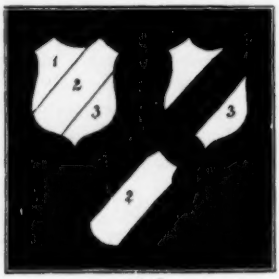


Fig. 17.

the picture. The latter is thus lengthened or shortened when desired, in one way only. It is sufficient to properly arrange the cylindrical mirror or cylindrical lenses, and then to adjust them by means of a screw fastened to the lens, in order to obtain the desired shortening or lengthening of

After projecting the object upon the number of squares required both for length and width, the focusing screen is withdrawn and replaced by the chief screen, which is firmly fixed in a dark slide (Fig. 6). Behind the chief screen is arranged a sensitive paper, the film of which is placed

against the screen. The back of the paper is covered and made light-proof by the lid shown in Fig. 6, and its front is protected by an adjustable shutter. After a short exposure and the necessary development, the photographic paper shows a squared picture which represents the finished design. The squares appear black on light ground and white on black ground. The outlines of the image appear in full squares. This is effected by the chief screen being arranged at a given distance farther from the objective of the dark slide than the focusing-screen, through which the picture is no longer projected in its original sharpness.

It is known that different colors in photography have a different effect, therefore the design of a colored picture appears in two different tones. Two tones, gray and black, upon a white ground, can easily be defined in card cutting. Thus, pictures of three colors, each of which causes a different effect in photography, give a design complete without any addition or alteration whatever. There being, however, many different colors which, when photographed, are hardly distinguishable by the human eye, it is necessary to paint the object according to a scale of colors specially constructed for this purpose, and always to be adhered to, two of a photographically indistinguishable effect never being applied against one another, which causes no difficulty whatever.

If the object is composed of more than 3 (for instance 6) different colors we must repaint 3 of the tones on the design with a transparent color. For 9 color objects we must use 3 colors, etc. In this way a quite sharp design can be obtained, for in repainting 3 tones with red, for instance, a light red, a gray red, a dark red ground is formed according to the white, gray, or dark ground. The repainting of such a design does not require any considerable amount of time or practice. Such a design already, with squares only, obtained by the use of the chief screen, can be used for weaving purposes in a great many instances.

Usually, however, the design represents binding threads, which are distinguished on various grounds by squares of a different position and color. To make such designs a number of so-called "binding-rasters" are used, containing either one or several bindings. Figures 7 and 9 show how the single bindings, and Fig. 10 how the compound bindings copy. Fig. 8 shows the result of these three screens in the design. The binding-screens have no lines, but single, white, transparent bindings upon an opaque ground, and vice versa. The single bindings are distinguished by various signs as □, ■, +, ×, ✣, etc., which represent at the same time different colors, and are thus chosen, so that two or three falling upon one another, they can still be exactly distinguished, as shown by Fig. 10. With the help of these binding-screens any desired binding can be copied by photography on to any place whatever of the design. If for instance, a five-binding satin is to copy a certain color of the object, we slide the respective binding-screen behind the chief screen into the dark slide, and in order to work the desired color only we put a colored glass (color filter) in front of the lens; this glass will only allow the rays of that certain color to penetrate. For other colors of the same design other colors are used along with the respective filters. It is evident that several bindings can also be copied on to one and the same place of the design, either single, by means of single binding-screens; or compound, by means of compound screens. All designs obtained through binding-screens, and having single panels which represent different colors and have different bindings, need not be painted, because the various panels can exactly be distinguished from each other by above marks. Such a design causes the same effect as, for instance, many designs printed in textile papers. The use of the chief screen, when copying through binding-screens, offers the advantage of overcoming any defect which might be caused by the slightest movement of the binding-screens

in the dark slide, for such movements are hidden and regulated by the squares of the chief screen. The chief screen, however, may be dispensed with, and the time of exposure reduced to a minimum. In such a case the screens are strictly adjusted by means of micrometer screws, for which purpose a specially constructed metal dark slide must be used. It will be understood that when dispensing with the chief screen, the binding screens must have squares as shown on Fig. 8.

For obtaining shaded designs, the so-called shading screens (Fig. 11) are used. Such a screen possesses all the transparent qualities required to obtain the desired shade. Moreover, these screens contain a lineage similar to that of the chief screen, so that this is not wanted in designing through shading screens. By a longer exposure (over-exposure) different groups of screen-panels are made visible on the respective parts of the printing paper according to the tone or shade of the picture. The arrangement of these screen-panels corresponds with the binding necessary to produce the tone or shade of the respective part of the object, so as to obtain a finished design.

Fig. 11 shows a shading screen specially constructed for this invention. Its effect is explained in the patent specification as follows:—The shading screen (Fig. 11) consists of square panels of six different degrees of transparency, numbered 1 to 6 in the sketch. Panels 1 are perfectly opaque (black), panels 6 perfectly transparent (white), whereas panels 2 to 5 have each a degree of transparency between 1 and 6. The panels 3 and 4 are each arranged in a diagonal row, while in the two following diagonal rows panels 1 and 2 and 5 and 6 change alternatively, as shown in Fig. 11. The whole screen consists therefore in diagonal rows interlacing in the same repetition as above, namely: 1 and 2, 4, 3, 5, 6. For explaining the work of these screens applied for the process which forms the object of this invention, we will first describe the copying of one pattern each of the different bindings mostly used. By directly over-exposing the screen, i. e., leaving it exposed to light for a longer period, we obtain the copy shown on Fig. 12, in which white panels are shown on a black ground, the former corresponding with the panels 1 of the screen which we know to be perfectly opaque. On a longer exposure, the light attacks all places of the printing paper which correspond with the lighter toned panels 2 to 6 of the screen, without regarding their shade, while those places of the printing paper only which correspond with the perfectly opaque panels, 1, of the screen are perfectly protected from the influence of the light. The panels, 1, visible on the negative (Fig. 12) are arranged the same as satin binding. If we make now a second negative from the screen, on which a plate of high transparency, 5, has been placed, those positions of the printing paper that correspond with the screen panels, 2, are also protected; for by covering panels 2 of the screen with a plate of degree 5 of transparency, a degree corresponding with shade 1 is obtained. By over-exposure the image shown on Fig. 13 is obtained, on the black ground of which the panels 1 and 2 are arranged in twill (Koeper) binding. By replacing plate 5 by a darker plate of degree 4 upon the screen, the parts 3 of the printing paper which correspond with the shade 3 are also protected; and an image is produced, which, as shown on Fig. 14, represents the linen binding. In the same manner, by using a plate of transparency 3, we again obtain twill binding (dark panels 5 and 6 on white ground as Fig. 15 shows), or, by a plate of degree 2, another satin binding with dark panels 6 on white ground (Fig. 16) may be obtained. If more kinds of binding are required, the number of degrees of transparency must be increased. In practice the plates of one degree each of transparency only are replaced by projecting the object of the design which is to be woven, or the picture, on to the screen in the camera. The

object may be considered a plate with various parts of different degrees of transparency corresponding with its tone or shade. If we now over-expose the screen in the camera through the picture, the equally light-toned parts of the print will at the same time show a group of panels, clearly showing the kind of binding necessary for its weaving. In the same way the equally dark shaded parts make visible the group of panels corresponding with another binding, and in exactly the same way the degrees of shade between the above are made prominent by other bindings. As larger parts of an equal and completely dark shade of the picture appear quite white on the print and would not show any binding, we overcome this defect by moving for a moment a white piece of paper in front of the lens. By this means the satin bindings with squares, same as Fig. 16, are formed on the whole sensitive film.

To explain in short we may add that: the clearer the light is falling on the screen, the more squares will copy. The design produced with a shading screen contains, besides the bindings occurring on the screen, a combination of the same, which appear on the border between one binding and the other.

Just as with flat ornaments for various colors different binding-screens must be used, so with plastic ornaments for several colors we apply other means of shading by the use of different shading screens. For producing designs by the means of this process, several kinds of printing paper will come in. For a very speedy production of the design bromide paper is specially adapted. In almost a quarter of an hour the design can be easily finished in this way. For shading screens the pigment papers, without charging, are the best. To use these papers with charging, they must be made from transparent material, their back side being exposed upon. These papers do not cause any tones disturbing the reading of the design.

For simplifying the design of flat ornaments, which are made in different patterns but are always with the same bindings, we make use of compound screens, the effect of which is the same as with the shading screen. On these screens the various bindings are represented by different signs of different degrees of transparency, wherefore other tones of the object copy with other bindings. With the screens described we can make designs up to 1,000 platinas. Larger objects must be copied in parts; the object is divided and each of the divisions photographed by itself. As in focusing, the picture is sometimes optically shortened by almost one half, so the designs are in many instances much shorter than hitherto.

In using color filters, the time of exposure is very irregular for different colors. The application of the color filters may, however, be dispensed with, when the time of exposing is reduced to a moment. For such a case the object must be photographed in the following way: We first make a sketch, the single panels of which are marked with the numbers of the screens to be used. This sketch is fastened flat and covered with transparent paper. On the latter we leave all those parts white which are to be copied with the first screen, and all the others are colored with red or black. The same is done on a fresh paper for every other screen required. We obtain thus three or four negative parts of the object to be woven, which divisions form a so-called vignette (Fig. 17). These divisions are placed exactly one above the other and brought in front of the lens and photographed separately by removing the first vignette, when copied, and photographing the next, etc. To make such vignettes does not take any time worth mentioning more than the painting of the sketch. When we have already one design finished, the vignettes can be made by cutting some parts out of it and pasting all those parts which are to be made by one and the same screen on to a black paper, so, of course, that all these

vignettes correspond with each other, which can easily be obtained. It will be evident that vignettes are used in such cases only which offer an advantage against working with color filters, etc. In many cases there are irregular bindings used out of mere caprice; for instance, twills running in different directions, for tying long floating ends. These bindings, which are prominent in the finished goods, make the impression of belonging to the design, which is actually not the case, whereas, on the other hand, they cannot but disturb the effect of the design; for this reason they should be avoided whenever it can be done. Such bindings seem not to be obtainable by the screen, but, if these special cross-bindings must be in the goods, we can make them with screens, by making them as visible in the object as they are to be in the goods, either by strokes, crooked lines, or otherwise.

There is hardly any knowledge of photography necessary for making designs by the foregoing process, because the work is merely mechanical, and is always done under the same conditions.

It is quite evident that the expense and the time required are greatly diminished in proportion to those of the previous method of designing, and the saving of both money and time can scarcely be expressed in percentage. Moreover, the effects, especially in strongly shaded patterns, are far more plastic, since the goods are photographically true. The screens used for the foregoing process can be constructed in different ways.

The various and most detailed experiments for the construction of the screens have proved the photographically obtained screens to be the best and cheapest. The positive containing the binding is made with varnish on designing paper and exposed to a sensitive glass-plate, when the screen for producing thousands of patterns is ready.

If the screen be equipped with warp-effect bindings, we can copy it on to another plate and thus obtain a negative, which gives a new screen with weft-effect bindings. The further multiplication of screens can then take place by simply copying.

To obtain the positive screen more exact, more beautiful and cheaper, we recommend that it be composed of single parts, printed in any desired manner on a greater scale. The expenses of a screen suitable for 800 platinas would be about $2.50. Thousands or any number of designs can be produced with the one screen thus obtained, each of which would then cost about 25 cents to 50 cents.

The photographic appparatus used for designing is most simple, but it may even be replaced by a camera obscura. A photographic studio is not required—a light room will do. In case of need the designing with screens can be done during the night and with artificial light.

The present invention opens new prospects, for instance, for portrait weaving. It is possible to obtain natural images with technical effects that were previously unattainable. The invention is of equal importance for weaving plush, damasks, paramount, curtains, carpets, gobelins, etc.

For a few shillings and in the course of a quarter of an hour we can make any designs whatever, and these ready for card cutting, which up to now have required a great amount of expenditure in both time and money. These designs have the advantage of being entirely free from all defects, which were previously unavoidable by human hands and eyes, for in the photographic process the bindings are mechanically designed by the light.

The fear that designers may be displaced will, as it has done many times before, prove unfounded. As the designing will not take much time nor require the expenditure of much money, many new designs will be combined and constructed, so that they can be otherwise employed.

The writer does not hesitate to admit that he had great doubts as to the merits of the invention at the beginning, but after a thorough study and practical test, he is convinced of the great utility and the perfect success of the invention, and he hails it as a process which opens quite new prospects to the textile industry.

Binding for Esquimos.

The following question and answer from one of the Textile World's German exchanges may be of interest to its readers, as it covers a defect, the correction of which will occasionally puzzle even the most experienced textile expert. Our object in reproducing it, is to create comment and study.

The questioner says that he manufactures esquimos according to the accompanying binding: 4,400 threads, 2 metres (1 metre=1.093633 yards) in breadth; three threads per dent, 260-270 picks per 100 millimeters (3.94 inches); warp and face filling 18,000 meters, and backing filling, 3,000 meters, per kilogram (2 lbs. 3¼ oz.). The pieces from the loom are 32½ to 33 meters, finished 29 to 29½ meters, long; 1.40 broad.

The questioner says that he cannot well alter the backing filling, as the goods must weigh more than one kilogram per meter. What is he to do? The German exchange says that by closely studying the accompanying design in its single parts, that is the upper and lower and stitch binding, it will be found that the three weaves do not harmonize one with the other, but differ essentially in their character. This is wrong in the composition of a double weave, as the operator must seek, as much as possible, to have the characteristics of the different tyings harmonize one with the other. This however, is not the case in the accompanying analysis, and to this very defect must be blamed the principal occurrence of the defect in the goods.

Fig. 1 is the upper binding; the four harness broken warp twill generally used for esquimos, while Fig. 2 represents the lower binding, the four-harness diagonal twill.

Fig. 3 shows the binding for the stitching of the two weaves, and here it is necessary to remark that it shows a perfectly diagonal character, differing from the two weaves to be united, and to this only is to be blamed the complaint that "the diagonal is visible on the face."

Furthermore, there is too great a difference between the weight of the upper filling and the lower filling. For two face pick, of 18,000 meters, or one per 9,000 meters, comes one lower pick of 3,000 meters per kilogram, consequently, the weight of the upper pick to that of the lower stands as one to three. Therefore, the cloth is too lean on the face, and that in the milling it undergoes a loss of round 10 -½per cent. in length, and 28.3 per cent. in breadth. This difference also in the milling proportion may contribute its share, that the unsuitably inserted stitching of the upper and

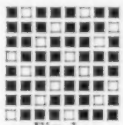


Fig. 1.

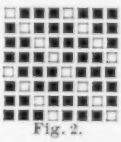


Fig. 2.

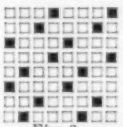


Fig. 3.

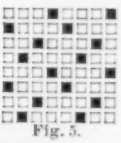


Fig. 5.

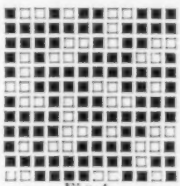


Fig. 4.

lower weaves has an injurious effect, a diagonal-like, upon the former.

From the statement of the question, it may be assured, says our exchange, that there is no special lower warp, and it may be taken for granted that the 4,400 ends of the warp consist of yarn of 18,000 meters per kilogram. Here it is proposed to use a yarn of 12,000 meters per kilogram for the ends that bind in the lower filling, therefore for the lower warp, and another for the lower filling of 4,500 meters per kilogram, so as to somewhat equalize the great disproportion in the weight between warp and filling. Finally, it is recommended that the binding shown in Fig. 4 be employed. Both the upper and lower weaves are the four-harness broken warp twill,

while the stitching takes place according to the broken four-harness filling twill, Fig. 5. These three bindings harmonize thoroughly.

Strain Upon Warps.

DESIGN PAPER FOR SPOTTED AND FIGURED GOODS.

The importance of putting as little strain upon the warp as possible while shedding is well known, and in selecting looms for a certain class of work it is always advisable to take into account the shape of the tappets as regards the lift and the time allowed for dwell and change, and also the dimensions of the crank and connecting rod. The effect of long and short cranks upon the force of the beat-up and the strain on warps has been previously dealt with.

The strain on the warp varies as the square of the distance moved through in a given time. Thus: If in two looms which have sleys of the same weight and in which the tappets are the same shape, therefore giving the same time for opening and closing the warp, and in one loom A the lift of the harness is 5 in., whilst in the other loom B the lift is 4 in., the relative strains on the warp will be—

As $5^2 : 4^2 : :$ strain on A : strain on B; or as $25 : 16 : : 1 : .64$; $16 \div 25 = .64$

The strain on the warp in loom B is therefore roughly only about 3/5ths that of the loom A.

Supposing the two looms have the same lift as well as the same dwell, other particulars being the same in both cases, except that loom A is running at 240 picks per minute and loom B at 200 picks, the strain on the warps will vary as the speed of the looms, because both looms having the same dwell they will also have the same time allowed for moving the harness from top to bottom of the shed. In other words, loom A will have to do the same work as loom B in time represented by 240 : 200.

Therefore as $240 : 200 : : 1 : 0.83$.

The strain on the warp in loom B is thus in this case about 4/5ths that of loom A.

Where there is a difference in the number of picks per minute as well as in the lift of harness, it is necessary to find the relative time allowed for doing the work required in each case. The following example will illustrate this class of calculation:—

Example.—Calculate the relative strains upon the warps in two looms A and B, the former running at 210 picks per minute, and having a lift of harness of 4½ in., and the latter running at 190 picks per minute, and having a 4 in. lift, both looms being in other respects of the same construction, with, say, half-a-pick dwell.

This, of course, leaves half-a-pick for lifting the harness in both looms. The relative strains per second will therefore be—

$$\tfrac{1}{210} - (\tfrac{1}{2} \times \tfrac{1}{210}) = \tfrac{1}{420} \text{ min.}$$
$$\tfrac{1}{190} - (\tfrac{1}{2} \times \tfrac{1}{190}) = \tfrac{1}{380} \text{ min.}$$

In the loom A there is 1/420th part of a minute for lifting the harness through 4½ in., whilst in the loom B there is 1/380th part of a minute for lifting the harness the shorter distance of 4 in. There will thus be a considerably greater strain on warp in loom A than in loom B.

$4.5 \times 4.5 \times 420 \div 60$ secs. $= 141.75$.

$4^2 = 16$ and $16 \times 380 \div 60$ secs. $= 101.3$.

And as

$$141.75 : 101.3 : : 1 : 0.68,$$

the relative strains on the warps per second are therefore—

As 1 : 0.68

In jacquard weaving the design paper must be ruled with a thick line to indicate each row of hooks in the machine. As in a 300 or 400 machine there are 8 hooks in a row, the design paper must be ruled with a thick line every 8 ends of the design paper to enable the card-cutter to cut the cards. In a 600 machine the hooks are arranged 12 in a row, and the design paper must have a thick line every 12 ends.

In weaving with shafts in dobbies or tappets there is no necessity for having the thick line on the paper in ordinary cases.

It is only necessary to have the paper ruled in the same proportion of warp to weft as there are ends and picks in the fabric. In all-over fabrics this is a simple matter, but in crammed stripes and checks it is not so simple. The following example will illustrate this:—

Example.—What design paper is required to keep the figure the same size in the cloth as on paper? If there are 100 ends per inch in the harnesses and the warp is reeded 40 ends, 4 in a dent, and 20 ends, 2 in a dent, alternately, the figure to be on the 4-in-a-dent satin, 80 picks per inch—

40 ends 4 in a dent = 10 dents.

20 ends 2 in a dent = 10 dents.

60 ends, and 20 (total dents in pattern).

There are 100 ends per inch in harnesses, and to keep them the same in the reed we requrie a reed with—

As 60 : 100 : : 20 : 33 dents per inch, or a 66 reed. A 66 reed 4 in a dent will have 132 ends per inch. The paper required must therefore be ruled in the proportion of 132 ends : 80 picks, or about 8 × 5.—J. T. Taylor in Textile Manufacturer.

Stamping Shoddy Goods.

The wool growers of the West, in their associated capacity, are attempting to establish means for stamping all woolen goods made from shoddy, in such a manner that the purchaser will know immediately the character of goods that he is buying. The incentive for this movement is the alleged extensive use of shoddy in the manufacture of woolens, and that the stamping of every yard of such goods would be a protection to the dealer, as well as to the consumer, and furthermore would prove a boon to the wool grower. One of the supposed-to-be practical advocates of measures that will bring about this state of affairs, stated at one of the meetings of wool growers that he had just boiled down some goods marketed at $3 a yard, and after two hours boiling, he found a quantity of shoddy in them. This practical (?) man has accomplished more in his own estimation, than any other person has been able to do. He evidently thought that he had accomplished something; but, really, the very means that he employed for destroying or retaining the shoddy in his piece of goods, would have a similar effect upon wool. He, perhaps, forgot that shoddy is nothing more than wool anyway. If the rags had cotton in them originally, the latter is extracted before the rags are picked. A very crude idea is evidently had on the part of a number of wool growers regarding shoddy and what constitutes it. The term "shoddy" does not necessarily imply that the material contains cotton, or anything else than pure wool. That there will always be a large demand for cheap substitutes for wool, admits of no argument. Shoddy cannot be stamped out by law, so long as there is a demand for goods made from it, by the public.

—A woolen manufacturer of Lewiston, Maine, expresses the opinion that neither soda ash nor a strongly alkaline soap should be used for washing wool. He says "A neutral potash soap only should be employed—that is to say, a soap containing no excess of free alkali. Of course, more soap will be necessary if it is neutral, but the gain in weight of the washed wool will be much greater. A potash soap should be used, as nature uses potash to the exclusion of soda in the composition of the 'grease' or 'yolk' wool fibres when growing in their natural state. What can be accomplished in washing with a perfectly neutral potash soap was exemplified at a recent exhibition with a soap made on the spot for the use of the wool-washing machines, by the simple admixture of pure caustic potash and tallow or cotton-seed oil by the cold process."

—The expression "young person" means a person of the age of fourteen years and under the age of eighteen years.—Mass. Statute.

KNITTING DEPARTMENT.

The Knit Goods Situation.

The opera-bouffe war with Spain and the rare continuance of unseasonable weather, combine to temporarily paralyze the market. This is exactly what I predicted a month ago. I quote from my April report: "The closest observers look for a continuation of present conditions several weeks." The weather remains as uncertain as the war. Then the sudden death of W. H. Rowe, the prime mover in the $30,000,000 Knit Goods Company, served to intensify the indeterminate feeling. And, speaking of this combine, the tendency toward organization for mutual protection is again shown by the incorporation in Albany of the National Association of Knit Goods Manufacturers, in which Switz Conde is prominent. This movement I also forshadowed last month by saying, after speaking of the Knit Goods Co., "If it does not harmonize the different interests, another association is a certainty. There are those who say another combination—of not necessarily a rival nature, is unavoidable." The Knit Goods Company was the outgrowth of long thought on Mr. Rowe's part and his death will give the movement a set-back in time, although it is not likely to disrupt the scheme as has been announced. Opponents insist the individuality will be lost in such a movement and that the great number of little concerns which can operate on small capital, make the plan impractical, but they have yet to prove their case. The lull in business due to war and cold rains has much the effect of a long holiday, except that expenses go on with slight reductions. Most of this deferred business will eventually come to merchants, but with a rush that is exasperating and more or less unsatisfactory to all concerned.

It is, doubtless, lucky that things have been so flat that it was useless to attempt to infuse life anywhere along the line, for had it been possible to move goods by sacrificing prices, rivalry might have brought about a big slump that circumstances could not justify. As a matter of fact, there is no reason for weak feeling in any direction. The market is so dead that quotations are well nigh stationary. With the sudden close of the war, which is likely any time, would come a decided advance in prices, which is already making itself felt in edibles. And should the war continue, a gradual stiffening is inevitable. There is absolutely no truth in the report that there have been large cancellations of underwear ordered for fall delivery. Here and there has been clipping of orders, but the increased demand for government supply has offset such shrinkage a dozen times, to say nothing of the large amount of money let loose in other ways by government necessities. As is natural at such a time, staples and the finest fancies have the call. In underwear, of course, the dull period has now been reached between heavy and light weight seasons.

Among the new fall hosiery styles are first grades of black lisle with colored heels and soles of lilac, blue, pink, etc. Embroidered hose are in increasing request. Lace stripes in silk are also forging ahead, particularly such tints as straw, cream and nile. A stocking is being shown, among the novelties that unites seamless and full-fashioned features. It has the rib extended down the front of the foot. It is likely to grow slowly, but steadily in favor.

—Camel's wool and camel's hair have long been used in Persia, Northern India, Afghanistan, and China to make robes for priests and princes, shawls, coverlets, carpets, and many other articles of coarse and fine texture.

Hints on Knitting.

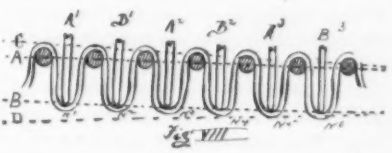
PERFECT AND IMPERFECT FIBRIC.

J. H. QUILTER.

A plain framework knitted fabric, to be a perfect fabric, must have all its loops of equal size, and any divergence from such loops make the fabric imperfect in some particular form or other. On the ordinary jack-sinker system of rotary frame, the thread is formed upon the bearded or spring needle in one or two operations. It may be formed over each needle individually or it may be formed first over every two needles and then be subdivided into an equal loop over every needle.

The principle of loop forming is immaterial providing that the whole of a row of loops when formed are of equal size. Fig. VIII shows a row of loops as hanging on the needles as first formed. The dotted line "A" shows the level of the needle which should be perfectly level and at equal distances from each other. This is effected by the needle bar to which the needles are fixed by some well known principle, being perfectly level. On each principle of machine there is usually one particular bar to which each other bar is set by templet. The former being of course perfectly true. If others are set correctly to same, they must also be true, but it will be shown that each of a series of bars which work in uniformity must be absolutely true to each other to the smallest fraction, even more so than the casual knitters will suppose. No rule-of-thumb work can be admissible in the adjusting of a knitting machine. Accurate adjustment is the secret to good work with economy. Let us for a moment study the relation of the needle bar and falling bar of the ordinary rotary, or other parts that take equal positions, on the more recent improved machine, and their relation to each other.

At Fig. VIII the line "A" represents the level of the needle bar, with each individual needle adjusted level to the same, and line "B" represents the line of sinker loop as regulated by the falling bar where one sinker only is used, and by falling bar and dividing process acting upon locking bar and verge bar combined where the two sinkers known as jack and lead sinkers are used. Take first needle bar as represented by line "A" and falling bar by line "B," if these are truely parallel with each other, so each loop must be equal as regards its length, but should either the needle bar be too high at the one end, as shown at "C," or lower than line "A," then, in the case of its being too high, the needle loop "B'" must be longer than loop "N²" and so on in proportion, or, if lower than line "A" then shorter in like proportion. Again if needle bar "A" is perfectly true and falling bar which regulates fall of sinkers is out



of line as at "D" then loop "N'" will be equally longer than "N²," and "N³" than "N²" in like proportion to the line "D." Of course the opposite end of needle bar may be out of line in similar proportion.

An example will at once show the practical effect of such a defect even to the minutest detail. Take a hose frame of a gauge making 20 courses per inch of fabric, the same being 28 inches long, or having $20 \times 28 = 560$ courses from top to end of heel, viz. in the leg of the stocking. Now suppose the difference between needle bar "A" and falling bar "D" to be 100th of an inch only, wider apart, each 100 loops on the selvedge would be so much longer, that in the total it would equal 5½ inches. Then one side of the stocking will be slacker and longer and in order that the seams may bring the side level, one side is taken up in greater proportion to the

other. Now such a stocking can never be made to lie straight after being finished; the seam will always have a tendency to twist round the leg.

I do not infer that even so great a discrepency will occur as shown in this example, but give this to show the effect of even the slightest little that may be imperceptible to the ordinary worker, if he does not thoroughly watch for the most trifling points necessary to make good work.

Each sinker throughout the whole width of the machine must fall to the level of the line "B," if each loop is to be of uniform size. There are, however, many causes that will prevent them so doing, and it is owing to these that we have smaller or larger loops appearing oddly or at intervals in the fabric.

It is a point to be observed in connection with bearded or spring needle rotary machines, no matter on what principle they are constructed, there is seldom any arrangement for taking each sinker to one level and their holding it until the completion of the loop. The sinkers receive a motion to cause them to fall or take their thread, but they may rebound or not even reach their lowest position at all. Here, then, lies the cause of unequal loops at intervals, such being at the time that the loops are not drawn to their proper length and retained there.

All practical knitters will say that without such a contrivance the loops do take their full length except in occasional cases. That is so, but it is the cause of its not doing so at these exceptional times that we have now to deal, for no effect occurs without a cause. Slur cocks are usually used to give action to jacks to give sinkers the required movement between the needle, and if these are not of the proper angle they have a tendency to drag upon the thread from the loop side, instead of the loose thread coming from the bobbin. Should such a back tention occur then the sinker is drawn up and the loop thus shortened.

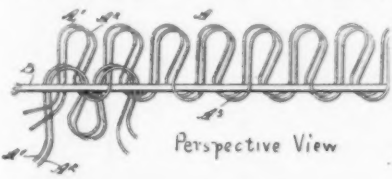
A popular cause of sinkers not all taking the same sized loop, is an undue tension that may at some time occur on the thread and so hold back the sinker and make a shorter loop; and should such tension remain during the formation of say, a few consecutive loops, a tight place will occur, as may be often seen; and not a few of the causes could be traced to the imperfect winding of the yarn, causing a drag at the bobbin. During the travel of the thread from the bobbin to the needle, it passes a series of guides. Should these be worn or rough, the thread may be caught and a tension occur causing unequal sized loops.

In all cases of knitting nothing is of more importance than the free thread and to ensure the same, the winding should be of the best. A little time and attention in this department will prevent many bad faults from the causes we have referred to.

In machines having two sets of sinkers it often happens that the two do not work in harmony. When this is so then each alternate sinker may fall unequal distances. For instance, "A^1, A^2" and "A^3" may be jack sinkers which fall on to the level of the line "B." Then sinker "B^1, B^2" and "B^3" would be lead sinkers and these might fall short of the line "B" making a short loop, or fall below the line "B" and so make a longer loop, each of which would show a distinct line down the length of the fabric, a fault known as liney work, each set of sinkers working independently of the others. To insure an equal loop over every needle there are adjustable bars of some kind or other as the verge on the jack sinker rotary, and the locking bar on the same frame; this latter lifting the jack sinkers to meet the lead sinkers, as they come down, bringing with them the verge to stay the upward movement of the jack sinkers. Should this verge or its equivalent in any frame be out of adjustment, the jack sinkers might not rise high enough, making a long loop on all jack sinkers, and a short loop on all lead sinkers, or, if the verge allowed the jack sinkers to rise too high, the lead sinkers would have the long loop and the jack sinkers the short loop; but properly adjusted all the loops are equal.

Knit Fabric for Underwear.

We illustrate, herewith, a recent invention for knit fabrics, for underwear, hosiery, blankets, etc., arranged with the intention of permitting its manufacture at a considerable less cost than the all-silk goods now used, and for which this new fabric is intended to be a high grade substitute. It consists principally of having a face thread and binding thread and a silk thread, of which the latter is bound in by some of the loops of the binding thread, and the binding thread is interlooped with the face thread. We furnish a perspective view of a part of the new fabric,



showing the interlooping of the face thread: binding thread, and silk thread, and also give a rear face view of the fabric, and a transverse section of the same with the silk face napped and tufted.

The knit fabric is provided with a body made of a knit cotton fabric "A," preferably formed of two threads "A'" and "A²," interlooped with each other and of which the thread "A'" is the face-thread and is in front of and regularly interlooped with the binding thread "A²", which in turn has some of its loops passed around the silk thread "B", forming the back of the fabric, so that a silk rear face is provided on the back of the cotton fabric. As shown in the drawings, every third loop of the binding-thread "A²" is interlooped with the silk thread "B", so that the latter floats at intervals on the back of the fabric. It is evident, however, that the binding-thread "A²" may be interlooped every fourth loop or any other desired number of loops, but always so as to cause a float of part of the silk thread on the back of the fabric.

The silk thread "B" is especially prepared and is comparatively much thicker than the cotton threads "A'" and "A²", forming the fabric "A", so that the loops "A³" of the thread "A²" for interlocking the said silk thread "B" are scarcely visible on the silk face, and they permit of napping the silk, as shown in the transverse section to give a tufted appearance, as at "B'", to the silk face on the back of the cotton fabric.

By the arrangement described the binding-threads "A²" are not visible either on the front face of the cotton fabric "A" or on the silk or rear face after napping the silk thread.

In forming the fabric the silk thread "B" is looped around the needles by placing it first in front of one needle and then back of the two next following needles. Then the cotton thread "A²" is thrown into each needle to bind the thread "B" at every third loop "A³", and the other thread "A'" is then thrown into the needles regularly to bind the threads "A²" at the front side of the silk thread "B". It is evident that any number of loops "A²" may be used for binding in the silk thread "B", and it is understood that the latter during the process of knitting is always around the needles, but not in the same, and the other threads "A'" "A²" are thrown into the needles to form the body of the fabric "A" and to cause the thread "A²" to bind in the silk thread "B".

The machine used is an ordinary circular-knitting machine having a circle of needles and a series of bur-wheels for looping the silk thread "B" around the needles, it will be seen that by the arrangement described the silk thread "B" for the silk face is loosely bound in by some of the loops "A³" of the binding-thread "A²" of the cotton

fabric "A", so that the silk threads form a very soft face, and this face when the fabric is manufactured into knit goods, such as hosiery and the like, is next to the skin of the wearer, and consequently the merits of the manufactured goods are the same, if not superior, to those of the expensive well-known "all-silk" goods.

For forming blankets the cylindrical weave is cut longitudinally and opened and bound in at its edges by suitable bindings or doubled-up edges sewed to the body.

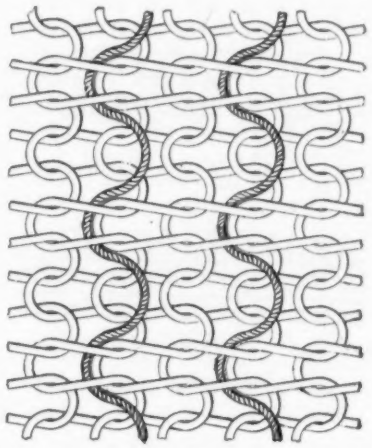
Ribbed Knit Pile Fabric.

We illustrate, herewith, a new ribbed knit fabric, such as may be produced on circular or straight knitting machines. The purpose of this fabric is to provide one having a backing or facing of wool, silk, cotton, or other suitable material. The circular knitting machine is preferable for this manufacture to a straight knitting machine. The facing or lining loops, as they are produced, constitute a pile, which may, if desired, be napped, sheared or fleeced. Our illustration gives a view of the fabric with the threads widely separated, for the sake of clearness.

The body of the fabric is formed of inner and outer body ribs or wales, knitted in the usual manner. Upon the inner side or wearing-surface of the body as thus constructed is formed a lining made up of extra or pile threads shaded in the drawing, which may be of a material the same as or different from the material forming the body of the fabric.

It will be noted that the pile-threads, united with the inner ribs and formed into pile-loops, both reinforce the body-threads of the fabric and protect the ribs on their inner faces. The pile-loops, further-more, may be easily varied in length and thickness, thus varying the thickness and weight of the fabric. Moreover, inasmuch as the pile-threads lie loosely behind loops, they may also be made of threads much thicker than the body-threads without detracting from the flexibility, elasticity, or softness of the fabric and without detracting from the smoothness of its finish.

It has heretofore been proposed to tightly interlace fleecing-threads with the meshes of the outer wales of a ribbed-knit fabric; but in such cases only small or slender fleecing-threads, comparatively, could be practically employed, because thick fleecing-threads would cause the outer wales to project over the outer face of the fabric at the points of such interlacing, and thus form bunches or projections which would mar the appearance and finish and value of the fabric. In the fabric shown here, however, it will be seen that quite a thick-pile-thread, comparatively, can be successfully used.

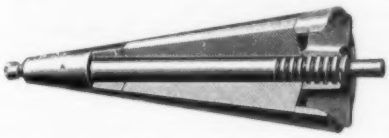


—Every person or corporation employing females in any manufacturing mechanical or mercantile establishment in this Commonwealth shall provide suitable seats for the use of the females so employed, and shall permit the use of such seats by them when they are not necessarily engaged in the active duties for which they are employed.—Mass. Statute.

—The Greeks and Romans became acquainted with cotton much earlier than with silk.

Cone Tube Mandril.

We illustrate, herewith a cone tube mandril known as the "Sticker" Cone Tube Mandril, manufactured by the Jackson Patent Shell Roll Co., Pawtucket, R. I. Our illustration represents a sectional view of the mandril, which, as will be seen, is simple in its construction. There is nothing about its mechanism, it is claimed, to get out of repair or wear out. The shaft



A has bearings at each end, and is provided with a thread at the back end. On this shaft is placed first, the rubber collar B, then the tapered wooden sleeve C, and lastly the nut D. The sleeve C, is loose on the shaft in order that by a turn of the nut, the sleeve will be forced against the rubber collar, expanding it outwardly against the paper tube, thus holding the tube securely and causing it to run perfectly true with the mandril, the rubber conforming to the irregularity of the paper. To use this mandril, the tube is held in the left hand and the mandril inserted, and the nut turned to the left.

Sweat Pads.

There has been devised an improvement to knitted fabrics having particular reference to sweat-pads surrounding the armpits of the garment. The object of the device is to provide a light summer garment with a combined reinforcement and perspiration-absorbent at each of the armpits integral with the sleeve-body and to prevent the soiling of the outer shirt, waist, or garment at that point by perspiration. It consists in several new and novel features of construction.

The body of the garment is constructed in the ordinary way, having sleeve-openings in the ordinary way, to which the sleeves are secured. The sleeves are constructed by knitting a cylinder and then cutting it in two upon the zigzag or ogee line as shown, each sleeve-piece then having the form as shown. The ends are folded in a suitable distance; the folded-in portion thus forming a pad. A body-pad consists of a piece of suitable material of substantially the shape shown. The sleeve-piece is seamed in by stitching through its doubled edge and the pad and the sleeve-piece and the remainder of the edge of the arm-

hole-opening, whereby the pad applied to the body and the folded-in portion of the sleeve-piece together constitute a continuous absorbent and the doubled edge constitutes a reinforcement integral with the sleeve-piece and seamed to the adjacent parts, all extending a suitable distance from the armpit upon the body and sleeve.

The pad is preferably constructed so that the ribs will lie lengthwise of the body, and the same with the pads upon the arm, so as to prevent irritating the body and arms.

The flap ends of these pads are pref-

erably left loose, although it will be evident that either or both may be stitched at their ends or sides.

A Reinforcing Thread.

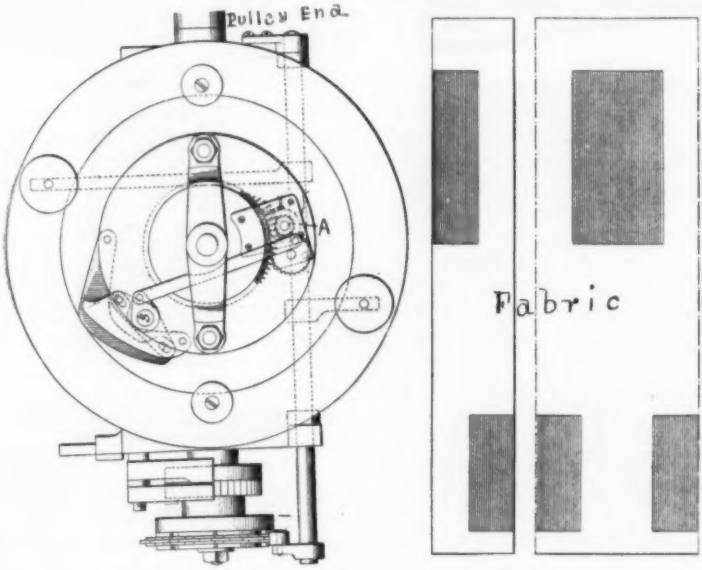
A device has recently been invented to be attached to a knitting machine for introducing into a knitted fabric an auxiliary or reinforcing thread in addition to the ordinary threads which compose the fabric for the purpose particularly of forming reinforced portions, as at the knees and heels of stockings. In carrying out the purpose of the device there is employed an auxiliary-thread carrier, combined with means coacting therewith to clamp or release the thread, whereby the thread when released may pass freely to the needles and be knitted into the fabric, and, when clamped or held against, free movement will be broken off. By these means the auxiliary thread may be introduced in each course for a greater or less extent.

The device also embraces the combination of the auxiliary-thread carrier with parts for operating the means for clamping and releasing the thread and with pattern mechanism for automatically operating such devices.

The device also embraces means for controlling the operating-cam of the knitting-needles to produce loose courses while the auxiliary or reinforcing thread is being introduced.

We give, herewith, a plan view of a machine embodying the device. At "A" is to be seen the auxiliary-thread carrier. Also, we give diagrams showing the reinforced fabric as produced upon a machine having the device.

The general construction of the knitting-machine is not material to the purpose of the device.



For purposes of illustration we have shown the device applied to a circular-rib-knitting machine of well-known construction, in which the needle-cylinder and dial are stationary, while the cam-ring and cam-dial rotate.

—The fine underwool of the goat does not appear to have been used in ancient Greece or Rome, as mention is only made of goat's hair, and that was manufactured into the coarsest fabrics; but farther East goat's wool was wrought into fabrics in very early times.

Chinese Cotton Mill.

The Viceroy Chang-Chih-Tung's cotton mill at Wuchang, China, is described as containing 30,000 spindles and 1000 power looms, one person attending to each loom. There are 2000 operatives, mostly children, in the factory, which is lighted up electrically and possesses a practical fire-extinguishing system. The coal employed as fuel in the boilers comes partly from Hunan and partly from Japan. The province of Hupeh supplies some of the raw cotton used, while the environs of Shanghai supply the remainder. The latter has a longer staple, which, however is generally defective. Only cheap cotton goods are woven on the looms. Only one width is woven, thirty-six inches English, in which length the pieces containing forty yards are laid. The selling price of a piece of cotton cloth, forty yards long and thirty-six inches wide, is at present five Mexican dollars, a price which, with the cheapness of the raw material and of the labor employed, is stated to leave a profit of from forty to fifty per cent. The engines and machinery have been procured entirely from England, and the working is superintended by an Englishman, the only European in the concern.

Cotton-seed Oil in France.

The French Minister of Commerce received an important delegation, in January, representing various chambers of commerce, asking for a customs duty on all foreign oleaginous cereals. It was stated that American cotton-seed oil, produced in great quantities and at a low price by the United States, competed ruinously with French oils. Objections had been raised to any tariff by the soap makers and lubricant manufacturers, but these objections were met by the statement that America could not well protest against any duty, as she imposed a duty of 75 per cent. on olive oils coming from France, whereas the delegation only asked for a 20 or 25 per cent. duty on American cotton oil. In reply, the minister said that he remained as faithful as ever to the protectionist doctrine of France, and he recognized the danger from this latest form of American competition. The Government would be compelled to act with reserve, on account of diplomatic negotiations with the United States. But the matter would have their best attention, and, if the Chamber seemed disposed to act favorably on the matter, the tariff would have his, the minister's, support.

—Russia in 1843 had only 350,000 spindles, now she has about 5,000,000, and has not only been able to eliminate foreign competition in her own interior, but is exporting. One-fourth of the quantity of cotton worked comes from Central Asia and Caucasia. That grown from American seed equals the imported American both in staple and strength of the same. This country uses one-tenth of the European consumption.

—The whole of China will be opened to foreign trade within a few years' time. That portion of the empire which falls within the influence of Great Britain comprises the heart of the country. The valley of the Yang-tse-Kiang is not to be alienated to any other power. In other words, Great Britain holds a political mortgage on it, on which that country may in time be forced to foreclose.

—Gold and silver were woven into fabrics by the Indians and Persians long before these metals were known to the Greek and Romans, and although Alexander and his generals employed cloths of gold and silver for clothing and tent furniture, it is probable that these materials were only used to a very limited extent, even at a considerably later period.

—In the time of Homer the manufacture of flax, if not unknown to the Greeks, was practised on a small scale, for the use of linen cloth was rare amongst them; indeed, the only part of Greece where flax is recorded to have been grown was Elis.

POWER DEPARTMENT

O. R. YOUNG, M. E., Editor.

The Worthington Compensating Cylinders.

Editor Textile World:

In your April issue W. O. Webber, while describing the high duty attachment of the Worthington pumping engine, ascribes the origin of the ideas embodied in this attachment to a J. D. Davies, who "probably got his idea from A. S. Cameron."

In the "Annual of Scientific Discovery," published by Gould & Lincoln, Boston, 1852, reference is made on page 23, to a device which contains the fundamental idea of the Worthington compensating cylinders. It is called "Gregorie's Patent Equalizer, or Power Regulator." The theory of this device corresponds exactly to that of the compensating cylinders of the Worthington engine, because Gregorie's Equalizer not only performs the function of absorbing work during the first half of the stroke, to give it up again in assisting the piston to complete the stroke, but it does so in exactly the same way in which it is done by Worthington's cylinders—that is, the compensating cylinder piston receives two strokes for one of the main piston, and the cylinder oscillates on an axis as does the Worthington compensating cylinder.

I presume the date of this patent (1850) is earlier than the dates of the invention of any of the three men alluded to by Mr. Webber.

What Worthington was really the first to invent was not the compensating cylinder broadly, but its combination with an accumulator used to supply water under pressure to the compensating cylinders, this pressure being maintained by the water pumped. The last mentioned feature is actually the important one in the Worthington high duty pumping engine, and it is the great practical advantage and safety of the combined arrangement adopted by Worthington which accounts for his success where the inventions of Gregory and others failed of recognition.

GEORGE I. ROCKWOOD.

Worcester, Mass.

Practical Electricity.

TROUBLES.

(Continued from May.)

In most dynamos and motors the exact position of the neutral points can not be fixed but will vary according to the load of the machine. For instance in the case of a dynamo with a given number of lights burning, the brushes may be properly set at the neutral points and running sparklessly, now let the number of lights burning be increased or diminished to any considerable extent and sparking, more or less destructive, will commence and continue till the brushes have been shifted to the new neutral points by means of the rocker arm. These points are determined only by trial.

This shifting of brushes or giving them a lead as it is called, is necessitated by armature reaction or the magnetizing effect of the current in the armature, tending to create a powerful magnetism which distorts the field.

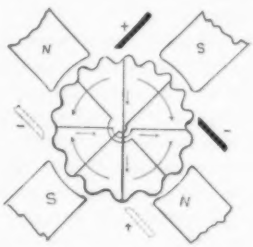
It is proper to state here that there are some dynamos and many motors in which it is not necessary to shift the brushes, no matter how much the load changes. In these the field has been made strong enough to overpower the armature reaction. Again in another class of dynamo the moving of the points of contact is taken advantage of as a method of increasing or decreasing the E. M. F. This is the

case of constant current arc machines.

It is not only necessary to shift the brushes to the neutral points by means of the rocker arm but care should be taken to see that the brushes are diagonally opposite each other. This can be accomplished by counting the number of segments of the commutator, measuring with a piece of thread or other device marking the opposite segments and setting the brushes to this mark.

The setting of brushes is perhaps the most important duty of the dynamo tender and a brush, a fraction of a segment out of position will often cause serious sparking.

Exceptions to the rule for setting brushes diametrically opposite will appear in the case of multi-polar motors with cross connected armatures.



Circuits of cross connected Armature. Four Pole. Two Brushes

FIG. 2.

These machines may be supplied with two sets of brushes or as many sets as there are poles. For instance, four pole machines with two sets of brushes require them to be set at 90° apart; six pole at 60° or 180°, and so on.

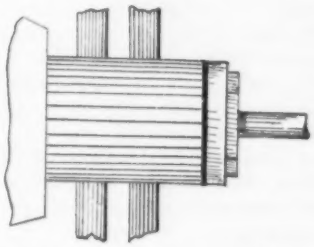
Fig. 2 shows the armature connection and the position of the brushes in a 4-pole machine with cross connected armature. The arrows mark the direction of the current in the armature connection. It is obvious therefore that no one should attempt to set the brushes on such a machine without first determining from a blue print or other source, their correct position and then keep them there.

Should the brushes be set very far out they will probably cause the safety fuse to blow and in the case of a dynamo it will fail to generate, which will be treated more at length under another head.

Commutators rough or out of true.

The commutator may have high bars or low bars due to loose shell or an unusually hard specimen of copper.

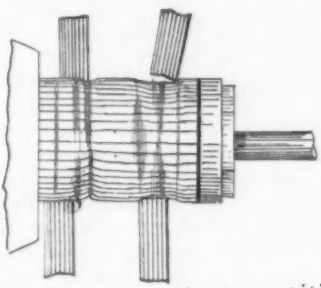
A poor connection between the leads



Commutator in good condition

FIG. 3.

and the tongue of the commutator segment will also develop a flat, hard mica between the segments which does not wear down as fast as the



Commutator in bad condition

FIG. 4.

copper, all of these produce a rough commutator.

The symptom in this case will be a chattering of the brushes accompanied by sparking, which is sometimes apparent by the sound. Touch the commutator with the tip of the finger the least roughness is at once apparent. Turn the armature slowly by hand. any eccentricity will be indicated by a rise and fall of the brushes.

Cut 3 represents the commutator as it should be, with brushes properly set and surface of the commutator smooth and glossy.

Accompanying it is a sketch of the same commutator in bad condition with commutator scarred and ridged and brushes badly set.

In cases where the commutator exhibits eccentricity or is deeply cut, the armature should be taken out, accurately centered in a lathe and the commutator turned off. Taking off of course as light a chip as possible.

In large armatures it is often more convenient to rig up a special slide rest and turn off the commutator with the armature turned at slow speed in its own bearings.

A loose bearing it may be added will cause chatterring of the brushes, the attendant sparking and cutting of the commutator.

If the bearings are loose and worn have them rebabbitted or put in new ones.

Fig. 4 is a slide rest which clamps on to the pillow-block in place of the rocker arm.

A commutator slightly rough can be dressed down with a fine file and final application of fine sand paper, meanwhile the armature must be turned at medium speed.

If the machine in question is a dynamo, it is advisable to raise the brushes, start the engine at medium speed and apply the file or sand paper, or both, as the case may be, thus avoiding the clogging the brushes with dirt and copper dust. With the motor it is different as we must rely on the current to turn the armature. It is therefore an exceedingly dangerous practice to use a file. Sand paper, however, may be applied without danger. It is a good plan to put a little oil on the sand paper, for in this way the particles of copper are gathered and prevented from flying into the armature and thus increasing the danger of short circuits and burn out.

It may be stated as an axiomatic rule that copper dust and metal filings in general should not be allowed to collect about a dynamo or motor. For this reason never use emery cloth on the commutator for the reason that the particles of emery are so sharp they become lodged in the copper of the segments, converting the commutator into a veritable grinding tool. Moreover the particles of emery get into the mica, causing short circuits.

(To be continued.)

The Union Engine Stop.

The many accidents to engines and machinery which happen almost every day in the year, have led many to endeavor to invent some method of stopping the motive power from a distance or in the room in which the accident occurs, which would be reliable, simple, easy of maintainance but effectual in action when needed.

Among the recent stops placed upon the market is the "Union" manufactured and installed by the Union Stop and Signal Co., Fall River, Mass.

The Union system was invented in 1890 and is free from false shut downs and alarms.

The automatic switching device for switching the stopping device out of circuit after it has done its work and switching in the signal bell, is also very important, as it furnishes a mode of communication from the station operated to the engine room, and by a code of signals all necessary orders can be sent.

The whole system can be tested at will by the engineer without interfering with the running of the engine so he may know at all times whether his system is working or not.

In case of trouble, which in some other systems would shut down the engine, a small bell is rung which notifies the engineer that the system is out of order and he can then have it repaired.

In many instances where the boilers are distant from the engine, a signal is rung in the boiler room to notify the fireman that the engine is stopping.

Where water power is used in connection with steam, the water wheel being regulated by the engine, the "Union System" successfully operates and controls such a motive power plant. With it both steam and water flows are controlled by the same button and the water gate is closed with the safe speed which is so essential.

In manufacturing establishments

where water only is used, a single system is ued which controls the water gate and thus becomes an automatic gate man.

and shows a Corliss engine equipment.

It consists of a connecting rod "E" from the governor to the levers "I" and engages the wrist pin, "G," this

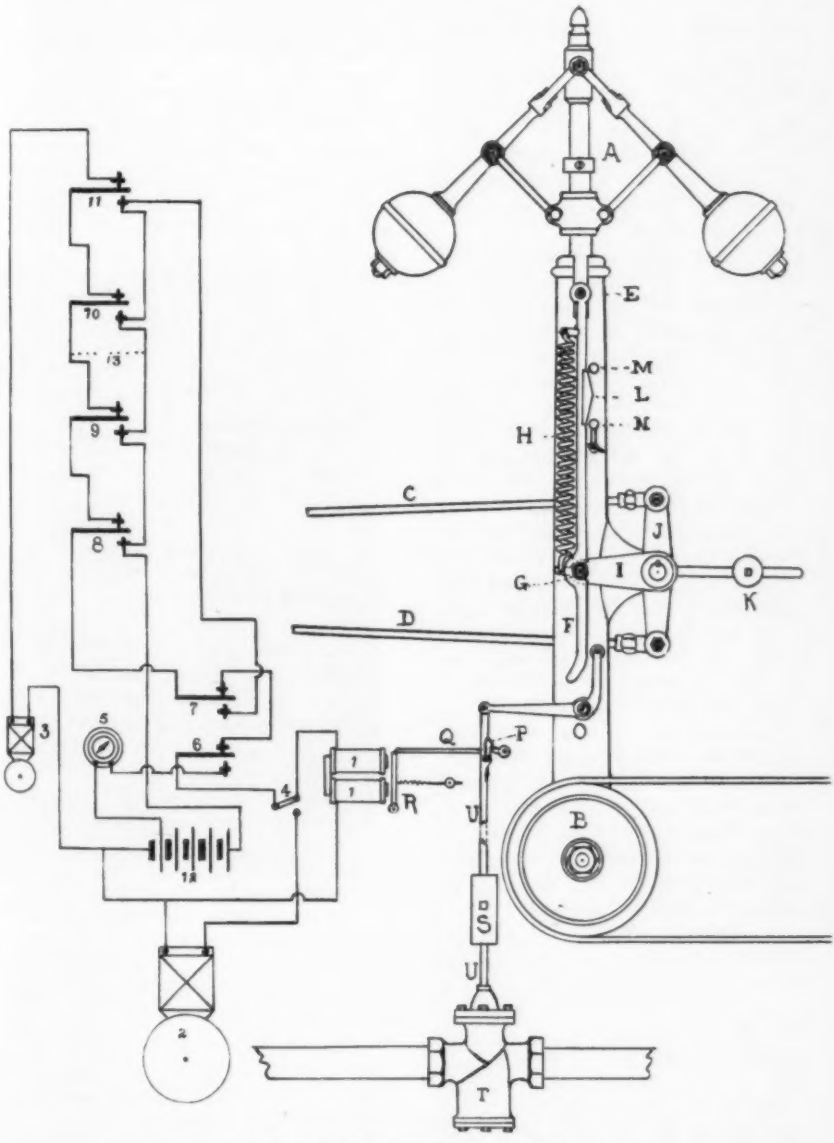


FIG. 1.—UNIO NSTOPAND SIGNAL.

The accompanying cut is a representation of the Union stopping device and Electric signal system taken from one of the special systems now in use

rod is held in position by the spring "H" and which answers two purposes to hold the rod "E" in position and to cause the stop motion to operate more

quickly when released, the extra weight which is added to the governor is compensated for by the counter weight "K."

The rod "U" is attached to bell crank "O" and carries the weight "S." This rod also holds closed a balanced valve "T" which holds the vacuum closed. The rod "U" is held in position by the hook "P" which engages detent "Q," and armature "R" operated by the electrical circuit. Attached to rod "E" is an incline projection "L," which is known as the speed limit device.

When the speed is too high, "L" engages stud "M" which unhooks connecting rod "E" from wrist pin "G" and allows spring "H" to contract and change position of valve rods "C" and and "D" to such position that the grate hooks cannot engage the valve gear and thus stops the flow of steam and the rod"U" being released at the same time the vacuum is broken and the flow of injection stopped.

If the speed becomes too low, "L" engages the lower stud "N" and the same result as previously described takes place. This stud can be turned aside by the engineer when shutting down, thus preventing the unhooking of the stop device.

The electrical connection of the Union System is simple. When the magnet No. 1 is operated, the armature is drawn up and the detaining lever 2 releases the rod "U" which drops operating bell crank "O," unhooking rod "F" from "G" thus shutting off the steam and breaking the vacuum as before described.

The elctrical circuit is of a special "open" form and is so arranged that no false alarms or shut-downs can be given.

Every inch of wire can be instantly tested and placed in practical operation without opening any of the stations or leaving the engine room and any part of the system out of order, immediate warning will be given of the same.

The test case which is part of the system is generally placed in the engine room and is an artistic ornament which at all times insures reliability to the whole system. The rod "U" also operates the switch 4, and cuts the stop motion out of circuit and places the electro mechanical gong, 2, in operation. Both the bell and stop motion is protected from false alarms by the small bell 3, which rings for all causes which would otherwise shut down the engine, except the operation of a station, it also gives immediate warning of such trouble.

The operating stations are represented by 8- 9- 10- 11 and are double contact keys in an iron smash box whose glass front must be broken before any signal can be given.

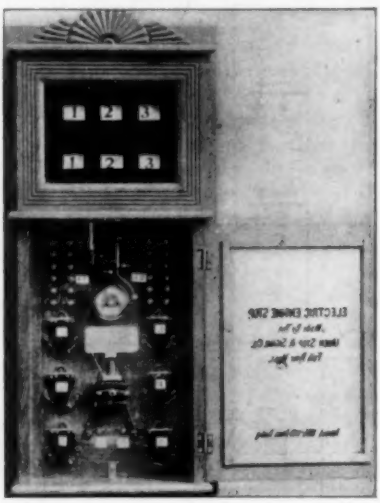


FIG 2.—ENGINE ROOM TEST CASE.

By depressing key 7, the wire in the box circuit is tested and rings bell 3, if the circuit is whole, but in case of a broken wire the bell remains silent.

By operating key 6 the reduced force of one cell of battery is sent through the coils of the stop motion which is insufficient to operate it and the movement of a galvanometer needle swings if the circuit is operative.

Where it is desired, an annunciator is connected in the circuit to locate the floor from which the alarm is sent and also gives warning when two stations are operated at the same time.

Figure 2 represents the engine

room test case which is placed in the engine room and intended to show the engineer whether his system is in working order or not. This case shows the arrangement for two mills of three floors each driven by two engines in one engine room. As hardly two of the systems are alike they are all built to order.

In order to test the wires of the system, the button 1 is first operated which tests all the wires in the station circuit of mill No. 1, and if all the wires are in proper working order, the bell 10 is rung and the annunciator

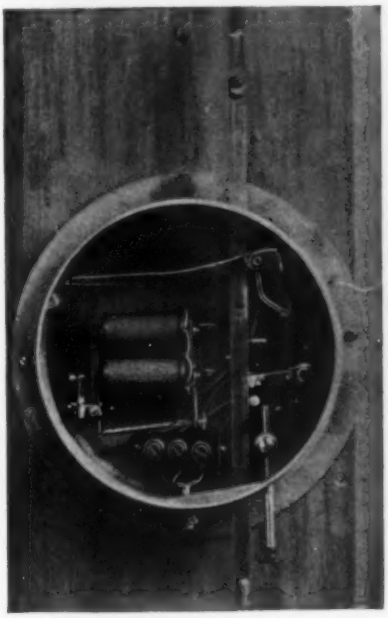


FIG. 4 —STOP MOTION.

drops showing that they are whole, but should any of the wires leading to the annunciator be broken, the drop corresponding to the broken wire will fail to drop while the others will.

Should the bell 10 fail to ring and none of the drops fall, it would show that either the battery was out of order or that the battery wires were broken.

In this way every inch of wire in the whole mill is tested without leaving the engine room.

Button 3 tests the wires in mill No. 2 in the same manner as button 1 tests mill No. 1 as previously described.

Button 2 tests the engine stop machines of mill No. 1 while button 4 tests engine stop machines of mill No. 2.

On the operation of either of these buttons a small current is sent through the wires leading from the test case to the engine stop and if the wires are in working order the instrument 9 is effected by the movement of its needle. But should any wire be broken no movement will take place, thus in no way can the engine be shut down while testing except by operating one of the regular stations.

Button 5 tests the signal bell in the engine room which is never in circuit except after the stop motion has operated and it furnishes communication with the station from which the signal comes. In testing, it rings as it does in practice if in working order. If the small bell 10 rings in conjunction with the signal bell it shows the engineer that the signal bell is in circuit with the stations and that the stop motion is out of circuit. Button 6 tests the battery and shows by the movement of the needle on instrument 9 whether the battery is weak, strong or normal.

In case of a "short circuit" or other trouble on the line which would otherwise shut down the engine, in this system the small bell, 10, is rung alarming the engineer that there is trouble on the line, and the annunciator shows the location, the engineer can then shut off the current by means of switches 7 and 8 and save the batteries from being weakened. But during all this the engine is unaffected.

All wires run from the test case so as to furnish easy means of finding any trouble that may occur.

Fig. 4 represents the electric stopping device complete and the amount of weight it will drop with a single leverage is over 100 lbs. with one cell of dry battery and can only be tripped by the battery.

Fig. 4 also shows the stop motion

with the cover removed. The upright rod permits of couplings to be attached to either end of it to operate by means of connecting rods the stopping devices and vacuum breaker.

The switch which is operated by the falling of the upright rod cuts out the stop motion magnets and connects in the engine room signal bell.

This switch is restored by the operation of the button shown to the right of the rod which after replacing the switch in its normal position cannot be again moved except by the falling of the rod or by removing the cover of the case so by no accident can the stop motion be thrown out of circuit after once being put in.

—The Chinese were weavers nearly 5000 years ago. Joseph's famous coat was made of camel's hair. Under the old Mosaic law the Hebrews were not allowed to wear garments of mixed linen or wool. It is said the American Indians made cotton garments before the coming of Europeans. Calico came originally from Calcutta, India. Broadcloth originally got its name from its width. There are more than 32,000 varieties of woolen goods known. Persons with incomes less than $500 a year were forbidden to wear furs in England in the fourteenth century. An American society organized for the encouragement of wool production in 1765 forbade the eating of mutton or lamb.

The cotton ginners of Texas, as represented by the Texas Cotton Ginners' Association, are having quite an animated time regarding the proper size for a cotton bale as it leaves the plantation or ginnery. At the last meeting of the association, a very spirited discussion took place on this subject, and a resolution was passed giving it to be the sense of the association, that the standard bale should be 24x54 inches. The use of bagging weighing not less than 2¼ pounds per yard, and ties weighing not less than 1½ pounds each were generally favored. The employment of narrow ties was generally condemned.

—Loom temples (which may be correctly described as a necessary evil) should be arranged to give only sufficient grip to the cloth to hold it out, because, if held too rigidly, the cloth is liable to be damaged, especially if it is of a very light build.

Assignment of Wages.

An interesting case to manufacturers, and other employers of labor, as well as traders, has been decided in the municipal court of Augusta, Me., affecting the assignment of wages. The case was that of Caret vs. Collins and Vassalboro Woolen Company, trustee. It appeared that F. S. Marcon, a Vassalboro merchant, held an assignment properly recorded, of the defendant's wages at the time the trustee writ was served by which the defendant assigned to Marcon all the wages he might earn for one year in consideration of twenty-five dollars. The court ruled that when Marcon had drawn twenty-five dollars from the company he could draw no more under his assignment, although he continued to trust Collins. As it appeared that before the trustee writ was served Marcon had drawn more than $25 the trustee was ordered to pay over the amount in its hands to the plaintiff. So far as can be learned this question has never before been decided by any court.

—Every factory in which five or more persons are employed, and every workshop in which five or more children, young persons or women are employed shall, while work is caried on therein, be so ventilated that the air shall not become so exhausted or impure as to be injurious to the health of the persons employed therein, and shall also be so ventilated as to render harmless so far as is practicable, all gases, vapors, dust or other impurities generated in the course of the manufacturing process or handicraft carried on therein, which may be injurious to health.—Mass. Statute.

—The central regions of Asia seem to have been the natural home of silk.

DYEING DEPARTMENT.

Dye Recipes for June.

The following recipes appear in the Dyers' Supplement, which is issued each month by the TEXTILE WORLD. The Supplement contains the colored samples, dyed according to recipes given. The selection of samples is carefully made, and it is the aim to show shades which are of especial interest to the dyer, and which the requirements of the market demand. The Dyers' Supplement is a 16 page pamphlet, in convenient form for preservation. Subscription price for the TEXTILE WORLD with the Dyers' Supplement is $3.

RECIPE NO. 81.

Orange on Cotton Yarn.

Klondike Orange R R on 100 pounds cotton yarn.

Prepare dye bath with
2½ lbs Klondike Orange R R
(The Hanna Schoellkopf Co., 135 No. Water St., Philadelphia.)
25 lbs. Common Salt.

Enter in yarn at 170° F; bring to boil while turning, and turn one hour at that heat.

Klondike Orange R R is a very fast color, and will combine with other direct dyes in producing various shades. The above amount of dye is for starting bath. One-quarter to one-third less color can be used in succeeding baths. (See recipe 93, this issue, in which Klondike yellow, G G is used.)

RECIPE NO. 82.

Light Blue on Worsted Yarn.

Glacier Blue on 100 pounds worsted yarn.

Prepare dye bath with
12 oz. Glacier Blue.
(A. Klipstein & Co., 122 Pearl St., New York.)
10 lbs. Glauber's Salt.
2 lbs. Acetic Acid.

Enter in yarn at 130° F; bring to boil while turning, and turn to shade at that heat.

Glacier Blue produces fine green shades of blue on wool and silk; the dye itself working on the fibre very slowly, and as the shade is pure, the dye should find its way among silk and wool dyers.

RECIPE NO. 83.

Dark Green on Worsted Yarn.

Fustic and Alizarine on 100 pounds worsted yarn.

Mordant for 1½ hours at boil, with
3 lbs. Bichromate of Potash.
2 lbs. Tartar.

Wash, and dye in bath of
5 lbs. Fustic Liquor M.
(Stamford Mfg. Co., 133 Front St., New York.)
10 lbs. Alizarine Blue, G. B.
3 lbs. Acetic Acid.

Enter in yarn at 160° F; bring to boil while turning, and turn to shade at that heat.

This dye is well adapted for dyeing yarns, piece goods, and raw stock, and is fast to light and fulling. Fustic M is a very concentrated and pure extract, and well adapted for combining, on account of its pureness. (In recipe 76, Alizarine Blue, G B is used with Logwood N for a dark blue on worsted yarn.)

RECIPE NO. 84.

Black on Shoddy Cloth.

Cotton Warp Black No. 8 on 100 pounds of cloth, cotton warp and shoddy and mungo filling.

Prepare dye bath to start with
5 lbs. Cotton Warp Black No. 8.
(Anchor Color Mfg. Co., 462 Cherry St, New York.)
30 lbs. Salt.

Enter in cloth cool, work 15 minutes, bring slowly to boil; boil one hour, shut off steam, run 15 minutes, lift, wash. For future kettles, use ½ less dye.

Cotton Warp Black No. 8 is a fine color for mixed goods. It dyes the same shade on cotton as on wool, giving a fine and bloomy black.

RECIPE NO. 85.

Light Drab on Cotton Flannel.

Cross Dye Drab on 100 pounds cotton flannel.

Prepare dyebath with
1 lb. Cross Dye Drab.
(Read Holliday & Sons, Ltd., 100 William St., New York.)
2 lbs. Soda Crystals.
25 lbs. Common Salt.

Enter in yarn at 140° F.; bring to boil while turning, and turn to shade at that heat.

Cross Dye Drab will dye both dark and delicate shades, and at the same time produce level ones of extra fastness. This dye can also be topped off in a separate bath with bichromate of potash or sulphate of copper.

RECIPE NO. 86.

Brown on Cotton Yarn.

Diamine Brown B. and Oleine on 100 pounds cotton yarn.

Prepare dye bath with
2 lbs. Diamine Brown B.
(Wm. J. Matheson, & Co, 182 Front St., New York.)
3½ lbs. Oleine.
(Bosson & Lane, 36 Central Wharf, Boston.)
10 lbs. Glauber's Salt.

Enter in yarn in a dry state, at a boil; turn 1 1-2 hours at that heat, then shut off steam and turn ½ hour longer; lift, wash and dry.

Oleine is a very good mordant for the direct dyes. It helps the color very much, and produces bright shades, and saves time and expense, as it does away with the boiling-off of the yarn. (See recipe 29, February issue.)

RECIPE NO. 87.

Yellow on Worsted Yarn.

Alizarine Yellow T C on 100 pounds worsted yarn.

Mordant for 1 1-2 hours at boil, with
3 lbs. Bichromate of potash.
2 lbs. Tartar.

Wash off and dye in a bath with
3 lbs. Alizarine Yellow T C.
(A. Klipstein & Co., 122 Pearl St., New York.)
2 lbs. Acetic Acid.

Enter in yarn at 140° F.; bring to boil while turning, and turn to shade at that heat.

Alizarine Yellow T C comes in the form of a dark yellow powder, and is very soluble. It dyes fine shades of golden yellows. On a chrome mordant, it will combine with all mordanted extracts, and in itself produces fine fustic shades of yellows.

RECIPE NO. 88.

Black on Cotton Knit Goods.

Iso Diphenyl Black B R on 100 pounds cotton knit goods.

Prepare dye bath to start, with
6 lbs. Iso-Diphenyl Black B R.
(John J. Keller & Co., 104 Murray St., New York.)
20 lbs. Glauber's Salt.

Enter cloth at boil, run one hour at that heat, lift and wash. For future kettles, reduce quantity of dyestuff to four pounds.

This dye will produce with light dyeings, fine grays, slates, etc., besides dyeing a fine shade of a rich black. The dye does not exhaust, and for succeeding lots, a less amount is needed, and for standing kettles, a very cheap black can be made. Iso Diphenyl Black combines with the direct dyes. It is well adapted for shading, and does not rub or crock, and can be used on knit goods, cloth, or raw stock, and give good results.

RECIPE NO. 89.

Crimson on Spun Silk.

Alkali Fast Red B on 100 pounds spun silk.

Dye off in a bath of broken soap, with the addition of
2 lbs. Alkali Fast Red B.
(Victor Koechl & Co., 79 Murray St., New York)

Turn at from 160° to 180° F., till shade is produced.

Alkali Fast Red B will also produce fine and fast shades on wool. It is very soluable, and work very slowly and level on the fibre. It dyes fine and bloomy shades on both silk and wool, and the cost of dyeing is low.

RECIPE NO. 90.

Medium Blue on Worsted Yarn.

Sulphon Acid Blue on 100 pounds worsted yarn.

Prepare dye bath with
3 lbs. Sulphon Acid Blue B.
(Farbenfabriken of Elberfeld Co., 40 Stone St., New York.)
10 lbs. Glauber's Salt.
3 lbs. Acetic Acid.

Enter in yarn at 120° F., bring to boil while turning, turn 20 minutes at that heat, and add

1 lb. Oil of Vitriol.

Turn one-half hour longer, and then lift out.

We have here a dark shade of blue, and it will be found fast and not rub off. The dye bath does not exhaust too quickly, which assures level shades. (See recipes 63 and 75.)

RECIPE NO. 91.

Bright Red on Worsted Yarn.

Lanafuchine S G on 100 pounds worsted yarn.

Prepare dye bath with

3 lbs. Lanafuchine S G.
(Wm. J. Matheson & Co., 1e2 Front St., New York.)
4 lbs. Sulphuric Acid.
10 lbs. Glauber's Salt.

Enter in yarn at 120° F., bring to boil while turning, and turn to shade at that heat.

The Lanafuchines produce very fine shades of reds. The dyes do not bleed nor crock, and will combine with acid dyes for shading, and can be depended upon to work level. (See recipe 69, in the May issue.)

RECIPE NO. 92.

Brown on Cotton Yarn.

Columbia Brown R on 100 lbs. cotton yarn.

Prepare dyebath with

4 lbs. Columbia Brown R.
(New York & Boston Dyewood Co., 55 Beekman St., New York.)
25 lbs. Glauber's Salt.
2 lbs. Sal Soda.

Enter in yarn at boil and turn one hour at that heat.

Columbia Brown R is not only a direct dye, but it can also be diazotized and developed, the latter changing the shade to something darker. It will dye union goods a uniform shade. It combines with other direct dyes.

RECIPE NO. 93.

Yellow on Cotton Yarn.

Klondike Yellow G G on 100 pounds cotton yarn.

Prepare dye bath with

2 1-2 lbs. Klondike Yellow G G.
(The Hanna-Schoellkopf Co., 135 No. Water St., Philadelphia.)
25 lbs. Common Salt.

Enter in yarn at 170° F; bring to boil while turning, and turn one hour at that heat.

This firm has introduced a series of Klondike dyes, and as they are direct dyes, they will be found very fast, and will not crock. They work very level on the goods and penetrate the thickest fibre. They are marketed as a light brown powder, which is very soluable. They will be found very concentrated. The above amount of dye is for starting bath. For standing kettles, use ¼ to ½ less dye. (See recipe 81, this issue, in which Klondike Orange R R is used.)

RECIPE NO. 94.

Orange on Cotton Yarn.

Direct Orange R on 100 pounds cotton yarn.

Prepare dye bath with

3 1-2 lbs. Direct Orange R.
(Sykes & Street, 85 Water St., New York.)
25 lbs. Common Salt.

Enter in yarn at 170° F; bring to boil while turning, and turn to shade at that heat. Future kettles require about ¼ less dyestuff.

This dye, as well as Direct Black B, of the same firm, produces full shades, with a small percentage of dyestuff. Direct Orange R will be found an excellent color to use with Direct Black B and Direct Red, in producing combination shades. It possesses the property of giving strength and fullness of shades.

RECIPE NO. 95.

Green on Worsted Yarn.

Alizarine Green E B on 100 pounds worsted yarn.

Prepare dyebath with

3 lbs. Alizarine Green E B.
(C. Bischoff & Co., 87 Park Place, New York.)

Enter in yarn at 100° F., bring to

boil while turning, and turn one hour at that heat. Then add

6 lbs. Acetic Acid

to the dye bath, and turn at boil till bath is exhausted.

The dye used in this color is a fast one, producing light and dark shades, according to the amount employed. It can also be dyed on a chrome mordant.

RECIPE NO. 96.

Black on Cotton Knit Goods.

Iso Diphenyl Black R on 100 pounds cotton knit goods.

Prepare dye bath with, to start

6 lbs. Iso Diphenyl Black R.
(John J. Keller & Co., 104 Murray St., New York,)

20 lbs. Glauber's Salt.

Enter in cloth at boil, and turn one hour at that heat. For future kettles use four pounds of dye.

The Iso Diphenyl Blacks will be found excellent dyes for fast blacks; and as they are cheap and can be quickly applied on cotton and on cotton and wool, they should find their way readily into the dye house. (See recipe 67 for Diphenyl Black B on cotton yarn, and recipe 88, this issue, for Iso Diphenyl Black B R on cotton knit goods.

New Dyes.

We present in our recipes that appear in this issue, a number of dyes that may be new to our readers.

In recipe 81, the dye obtained from the Hanna-Schoellkopf Co., Philadelphia, known as Klondike Orange R R, appears for the production of an orange on cotton yarn. Another brand of this dye appears in recipe 93 for the production of a yellow on cotton yarn. This dye is recommended as being fast to light and to chlorine, on cotton. We refer to our dyer's comments for particulars.

An attractive shade of light blue on worsted yarn is seen in recipe 82, obtained from Glacier Blue, sold by A. Klipstein & Co., New York. This dye is useful not only in the coloring of wool, but more particularly for silk, on account of its very fine pure shade of blue. This house also furnishes the Alizarine Yellow T C in recipe 87, for a yellow on worsted yarn. This latter dye is recommended as being fast to milling and light.

The combinations of dyes furnished by the Stamford Mfg. Co., New York, as in recipe 83 and in previous ones, are always interesting to dyers and manufacturers.

Recipe 84 will be looked upon as a timely one, as furnishing an excellent formula for a black on shoddy cloth, produced by Cotton Warp Black No. 8, obtained from the Anchor Color Manufacturing Co., New York. This dye is especially adapted for mixed goods, and is fast to fulling, light, etc., and can be used at a reasonable cost. A considerable number of shades can be produced by using less amounts of dyestuff, from a gray to a jet black. Those wishing a good, fast, jet one-dip black might find it to their advantage to give this dye a trial.

Recipe 85 shows a light drab on cotton flannel, obtained from the use of Cross Dye Drab, sold by Read, Holliday & Sons, New York. The amount of dye used depends, of course upon the shade desired. It serves as a mordant for the basic colors, and some useful shades can be procured in this way. Alone, it gives good, fast, drab shades. The fastness of the colors produced by this dye, to acid, alkalies and washing, is excellent. Its fastness to light is absolute. It is claimed that it can be used in conjunction with the direct cotton colors, to produce a variety of useful shades.

Dyers will be attracted to recipe 89, showing a crimson on spun silk, from Alkali Fast Red B, obtained from Victor Koechl & Co., New York. This is a red azo color, which is put upon the market in two brands, R and B. It is an acid dyestuff for woolen goods, in an acid bath, though used in this recipe for silk. The most prominent property of this dye is its fastness to alkalies, and, therefore, goods colored with it will resist to a high degree soda, ammonia, street dirt, etc. The color is also fast to light and to

rubbing, and equalizes well.

The Lanafuchine S G dye, for the production of a bright red on worsted yarn, seen in recipe 91, was obtained from Wm. J. Matheson & Co., New York, and should attract attention. This dye possesses the valuable property of dyeing level, and is very fast to light, stoving and washing, and the shade does not change during drying and sponging. It also possesses the valuable property of not dyeing silk, hence shot figures can be produced upon wool and silk mixed goods. It is also well adapted for wool printing and for discharge effects.

The New York & Boston Dyewood Co., New York, furnish their Columbia Brown R in recipe 92, for the production of a brown on cotton yarn. This dye is a valuable addition to the series of well known Columbia brands sold by this house. It is a substantive cotton dye, which, on account of its excellent properties, as well as on account of its great coloring power, will doubtless prove of interest to dyers and manufacturers. This dye is a uniform product, and yields full, reddish brown shades of great intensity. It dissolves readily, dyes finely, and penetrates the fibre well. It is suitable for dyeing lace, cotton, yarns, cops, bobbins, and piece goods. It may be added, that this brand, contrary to the other Columbia brands sold by this house, may be diazotized and developed on the fibre.

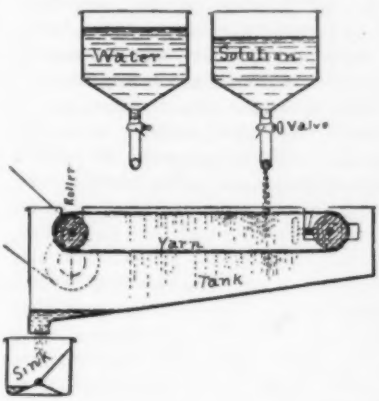
An attractive orange on cotton yarn is seen in recipe 94, from Direct Orange R, obtained from Sykes & Street, New York. This dye is principally for combinations with other direct dyeing colors and is on a par with the average direct dyeing colors in respect to resistence to light, air and soap.

Mercerising Under Tension.

An apparatus has recently been patented in France, for mercerising vegetable fibres under tension, the claim of novelty depending upon the combination of movable stretching rollers, reservoirs for the supply of the mercerising agent and of the washing water, and means for distributing these liquids on the moving stretched material.

We give herewith, a diagram of this apparatus.

The stretching arrangement consists of two rollers mounted parallel to each other, and revolving in bearing blocks which are capable of being easily removed from the sides of the tank. The rollers receive the hanks of yarn or other material to be treated which are slipped over them. The right hand roller can be moved in a direction parallel to its axis by screws, so as to give the hanks the required tension and maintain it during the process. After the first boiling the yarn is carefully spread out and stretched as tightly as possible upon



the rollers when the reagent selected to produce the chemical action of mercerising is poured on the extended surface. This solution issues from a tank mounted above the trough, in a regular stream through a slit or perforated tube. The surplus liquid drains out of the trough and is collected in one of the compartments of a double sink from which it is led into a receptacle. The left hand roller is revolved by driving gear, shown in dotted lines, and effect the slow and steady progress of the outspread yarn so that every portion of it is brought in its turn under the action of the stream of liquid. When the yarn has

been subjected a sufficient length of time to the action of the reagent the supply is cut off by means of a valve. The yarn has by this become dead, so to speak, and will not contract any further. The tension is now immediately relieved and the washing or neutralisation as directed by Mercer may now be proceeded with. The washing may be simply effected in a tub, thus releasing the machine and enabling it to do a larger amount of work. However, if it is preferred to proceed with the first washing without removing the yarn from the machine in order to eliminate most of the corrosive reagent and thus facilitate the handling, it can be done without any difficulty. The apparatus may include a second tank, also mounted above the trough and containing water. This water is allowed to run on the out-spread yarn through a slit or perforated tube controlled by a valve, and the surplus water is collected in the second compartment of the sink, the partition of which has been turned back, and passed on into the drain or into a second reservoir. After washing, the yarn can of course be dipped as usual in a neutralising solution. If the first washing is effected outside the machine the water tank can be dispensed with, as also the second compartment of the sink. The handling of the goods while saturated with alkaline or acid liquor would however in any case be easier than by the ordinary method, for the bearing rollers, being readily removable, can be taken out with their load and plunged as they are into the washing water without the necessity of touching the goods. It will be easily seen that the machine as described is capable of various modifications, provided it secures and maintains the tension of the goods while under treatment. Thus, for instance, the solution and water tanks may both be done away with, the active solution and the washing water being simply introduced into the trough and let out again afterwards. In any case, the motion of the material stretched on the rotary rollers will ensure the renewal of parts submitted to the action of the reagents and the evenness of the layer of material, so that there cannot be any agglomeration of fibres in some places, and the action is uniform throughout, which permits of a commercial working.

The Ventilation of Dyehouses.

The writer has had occasion from time to time to visit many dyehouses both in Lancashire and Yorkshire and therefore covering both the cotton and wool dyeing trades. He has been struck by the very general absence of any system of ventilation, a defect very noticeable in the winter months when it is a common thing to find dyehouses so filled with steam that it is impossible to see from one end to the other. It is at least exceedingly unpleasant for the operatives to work in such an atmosphere. We do not say that it is unhealthy, but the operatives cannot see what they are doing; or, if they are moving about, they cannot see where they are going, and accidents for this reason are not unknown in dyehouses. This trouble is enhanced by the system to be met with in some houses of running the hot spent dye liquors from the vats on to the floor of the dyehouse and letting them find their way as best they can into the drains. In the meantime, the steam from them adds its quota to the steaminess of the place. The best plan is to connect each dye vat with the drain system of the works and run the liquors direct into the drains and away to the purification system where such a one is in operation.

Now this steaminess is due entirely to the want of any system of ventilation whereby it is carried away as fast as it is formed. How this could be done best is by taking a lesson from nature herself, for in such cases it often happens that the nearer we follow her methods the better results shall we obtain. It will be noticed that the steam difficulty is less in summer than in winter; indeer, during the summer months it may be entirely absent. This is because the atmosphere

in summer being hotter has the power of absorbing more aqueous vapor than it has in winter time when the general temperature is lower. Now at the latter time of the year the atmosphere is practically saturated with watery vapor and cannot take up any more, while in summer it is far from being saturated and its absorbing capacities are nearly unlimited. We therefore see that the greater steaminess of dyehouses in winter time is due to the decreased power of the atmosphere for water vapor, and if we must get rid of the difficulty we must heat our dyehouses in some manner or another.

But we must also do something more,—we must adopt means to carry off the steam laden atmosphere from our dyehouses as fast as, if not indeed faster than, it becomes charged with steam or water vapor from the dye vats. This is no great difficulty; a revolving fan or fans creating a current out of the dyehouse into the open air or works chimney will do this easily enough. This current outwards will also create a current inwards which if the ventilation is to be perfect should not be left to chance but be wisely provided for, and the best manner in which this can be done is to provide a large air chamber filled with steam pipes; exhaust steam from some operation will do. This chamber communicates on the one hand with the atmosphere outside the works, while, on the other, tubes or pipes from it pass to various parts of the dyehouse; if there are any pillars supporting the roof of the dyehouse then these may be utilized for the purpose very conveniently, care being taken that the openings into the dyehouse are near the floor level. By this means a current of warm air is caused to continually flow through the dyehouse and being warm its absorbing power for steam is great and so it will, if the quantity be right and its flow properly regulated, carry off all the steam that will be produced in any average dyehouse. The flow of warm air need not be so great that it will be felt in the dyehouse; violent currents of that character are not required.

The work is much better done in a well ventilated dyehouse. It is freer from defects and risks of defects, and the operatives, apart from the fact that they are more comfortable, have less excuse for blundering. —Hurst, in the Dyer and Calico Printer.

The Action of Caustic Soda on Wool Fibre.

This interesting topic has hitherto received but little attention, and it is only now, under the impulse imparted by the great success achieved in the mercerization of the cotton fibre, that closer investigation is bringing to light new and unexpected facts. No doubt, what has hitherto discouraged attempts to derive useful results from the action of caustic alkali on the wool fibre is the prevaling impression, that such action must under all circumstances be a destructive one, and the more destructive the stronger the alkali. This impression, as Buntrock has now proved by a series of experiments, is entirely erroneous.

Under suitable conditions, writes E. C. Kayser in the Textile Recorder of Manchester, Eng., caustic soda not only leaves the tensile strength of the wool fibre entirely unimpared, but on the contrary, as in the case of cotton, greatly augments it, and as the treatment simultaneously brings about an increased affinity to coloring matter, there is every prospect that before long it may find practical application.

In compiling tables showing the effect of caustic soda of various concentration on the tensile strength of wool fibre, Buntrock operated with yarn first thoroughly wetted out and freed from water as far as possible by centrifugation; after 10 minutes immersion in the alkali the yarn was as expeditiously as possible washed in 1 per cent dilute hydrochloric acid, then in fresh water and dried. The result is expressed in the following figures:—

Original tensile strength..... 610

After 10 minutes immersion in caustic soda of—

4° Bé.... 510	22° Bé.... 195	38° Bé.... 740
6° " 485	24° " 200	40° " 770
8° " 475	26° " 235	42° " 815
10° " 430	28° " 240	44° " 740
12° " 250	30° " 335	46° " 730
14° " 210	32° " 420	48° " 720
16° " 180	34° " 440	50° " 620
18° " 110	36° " 580	
20° " 95		

Accordingly, the destructive action of the alkali reaches the maximum with 20° Be. It then rapidly declines, until at 36° Be. the tensile strength remains at par. From 38—42° Be. we have a rapid increase in tensile strength, and then again a gradual decline. In manipulating with strong alkali care must, however be taken when neutralising and washing to prevent, as far as possible, the secondary effect threatened by any rise of temperature, and by the dilute alkali formed in the fibre, or the results will be less favorable than indicated.

In regard to other physical changes brought about under this treatment, in contact with caustic soda of from 4—36° Be., the yarn rapidly becomes flabby and collapses. After ten minutes immersion it can be stretched to double its length, and beyond that easily torn. With the removal of the alkali, the yarn also recovers from the gelatinous state, and resumes more or less its former structure and strength, but it remains strongly felted. Alkali of 20° Be. acts most distructively. Within twenty minutes time the fibre is thoroughly disorganized, and begins to dissolve. On the contrary, caustic soda of 38—50° Be. hardly brings about any structural disorganization, causes no felting, and, as the tables show, leaves the strength more than unimpared. As to whether there is in any of these cases contraction analogous to that experienced with cotton, the observer has omitted to state.

The most advantageous concentration of the alkali thus being ascertained as one of 42° Be., it would then, with a view to practical application, be necessary to see how long the treatment may be extended before a retrograde movement sets in. The answer is contained in the following tabular observation:—

	Tensile strength.
After 5 minutes immersion in caustic soda, 42 Bé.....	820
After 10 minutes' immersion.....	815
" 15 " "	760
" 30 " "	715
" 60 " "	540

If the treatment is to be prolonged beyond a space of ten minutes, the intervention of a protective agent becomes clearly necessary, and for this purpose glycerine has been found highly suitable. Thus a mixture of equal parts of glycerine and caustic soda of 42° Be. acts in the following manner:

	Tensile strength.
After 5 minutes' immersion in equal parts of glycerine and caustic soda, 42° Bé...	830
After 10 minutes' immersion.....	870
" 15 " "	800
" 30 " "	790
" 60 " "	740

Lesser quantities of the dilutent, however, suffice for the purpose, for even in a mixture of 4 parts of alkali with 1 part of glycerine, during 60 minutes exposure, the fibre retains a resistancy of 715. The beneficial action of glycerine, in fact, is so pronounced, that it finds full expression even when coupled with a highly destructive alkali of 20° Be., for whilst the latter alone effects within ten minutes almost complete destruction, an addition of 25 per cent of the former leaves to the fibre a tensile strength of 550, and an admixture of 100 per cent culminates in a resistancy of 700.

Interesting as these observations are, they will doubtless be soon augmented by others, directed towards deriving fruits from this new and hitherto neglected field of textile chemistry.

—Cotton has for untold ages been a characteristic manufacture of China, India, Arabia, and the countries bordering on the Persian Gulf.

—The Greeks and Romans did not use cloth of beaver's wool until the fourth century.

QUESTIONS AND ANSWERS.

Under this head we undertake to answer, free of charge, to the best of our ability, any pertinent inquiry pertaining to textile matters received from any regular subscriber to the TEXTILE WORLD. Questions should be stated as briefly and concisely as possible. Inquiries pertaining to textile processes, machinery, improvements, methods of management, the markets, etc., are especially invited, as well as any legitimate discussion on the views expressed. All inquiries must be accompanied by the name of the person inquiring, not for publication, but as an evidence of good faith.

Lapper Waste.

Editor Textile World:

We send you a sample of waste made by one of our lapping machines. Should you judge from it that the machine is working as it should, and with its parts properly adjusted?

Georgia. S. T.

The sample sent us by our correspondent is by no means a bad one. We have seen worse in good mills, and better in poor mills. If we should be called upon to criticize it, we might say that there are two or three causes for there being so much good fibre in the waste. Possibly the fan power was too weak, or the beater grid and bars set too far apart. The beater should be set about 3/16", up to the feed roll, not over 1/4", at the most. The grid bars should be set so that they will present an even surface, yet room enough to let the largest seeds drop through.

Wages of Drawers-in.

Editor Textile World:

As a subscriber of yours, I should be pleased to learn what is paid by cotton mills for drawing in and reeding 1,000 ends, and also how much is paid to a girl for handing in the same number of ends.

New York. K. R.

Drawing-in girls are paid for print cloths, 9½ cents per 1,000 ends; for sheetings, from 9 to 11 cents per 1,000 ends; for twilled goods, from 10 to 15 cents for 1,000 ends; for ginghams, from 16 to 25 cents per 1,000 ends; and for fancy dress goods, cross drawing, from 20 to 35 cents per 1,000 ends. A girl for handing-in is not required, though sometimes employed, except for fancy cross draws.

Ring Travellers

Editor Textile World:

Do you know of any publication containing actual tests made with a view to determining proper sized ring travellers to be used for different counts of yarn, under different circumstances, as to speed, size of ring, etc.

South Carolina. W. S.

We know of no publication that will cover the inquiry of our correspondent. The nearest approach to it are the papers that were read on this subject at the annual meeting of the N. E. Cotton Manufacturers' Association, held in Boston, April 1897. At that meeting, A. C. Tingley, Providence, R. I., had a very excellent paper on "The Ring Traveller." He stated, among other things, that there is no rule that can be applied to every case to determine the size of traveller for any given number of yarn. For instance, on No. 28 yarn, print cloth mills use all the way from 4/0 to 15/0, according to the speed, size of ring, stock, etc., while the same sizes would also be used by other mills to spin from No. 15 to 70.

Costs of Selling Wool.

Editor Textile World:

The New York Wool Warehouse Co., New York, are advertising quite extensively through the Western states a statement intended to show the advantage to wool growers of disposing of their wool through the New York Wool Exchange. They give as a practical demonstration the net result of a sale of 137 bags of spring Texas wool, stored in their warehouse and sold last January, showing that the total expense was one cent a pound. The query arises in my mind whether this is as good an exhibit as could be obtained if the wool were disposed of in Boston. What is your opinion? The Wool Exchange statement is as follows:

28,582 lbs. at 15¾c.		$4501.66
Freight	$171.00	
Cartage to Warehouse 10c. per bag	13.70	
Storage 2 mos. at 10c. per bag per month	27.40	
Labor 10c. per bag	13.70	
Weighing at 5c. per bag	6.85	
Insurance 2 mos. at 2½c. per bag, per month	6.85	
Selling Commission—paid to broker, 1 per cent	45.02	284.52
Net to Shipper		$4217.14

Analysis:

Freight, per lb ....3-5c.
All other expenses, per lb .....2-5c.

Total expense, per lb. ..... .01

Or 14¾c. per pound in Texas.

Texas. G. A. S.

All of these items can be discounted in the Boston market, with the exception of freight. It might cost a little more in the way of freight to Boston than to New York. It would depend somewhat upon the point whence the wool was shipped, and whether it came by water or overland. We should say that the net result would be about the same in Boston as in New York. There would be a

saving on the freight to New York, but more would have to be paid for such items as cartage, storage and labor. There would be a saving in the Boston market in the cost of cartage of 2c. a bag; storage, 5 cents a bag; and labor 5 cents a bag. Weighing and insurance would be about the same.

Valencenes Edging.

Editor Textile World:

We enclose you a sample of Valencenes edging of German manufacture. We wish to use large quantities of this style of trimming, and will be pleased if you would inform us where the same may be purchased in this country or who is agent for the foreign manufacture.

Medinah.

The Millar Loom.

Editor Textile World:

Will you furnish me with information concerning the Millar loom, referred to in your last January issue?

Virginia. P. P. G.

We would refer our correspondent to page 76, May number of the Textile World, where a full description is given of the recent improvements to this loom.

Twisting-in Cotton Warps.

Editor Textile World:

What is the usual amount paid per thousand ends for twisting-in cotton warps for dress goods?

New York. G. C.

The twisting-in of cotton warps is usually done by men, who are paid by the day, from $1.50 to $2.00, and is mostly for jacquard looms, though sometimes it is done for other kinds of looms, where the warps are alike in the number of ends, and the weave the same.

Shuttle Manufacturers and Shuttle Blocks.

Editor Textile World:

Will you kindly send us a list of the manufacturers of shuttles in this country, and also exporters of shuttle blocks, if there be any such.

Tennessee. L. S. & Co.

These inquiries have been answered by us in previous issues of this magazine, and we would refer our correspondent to the issues of June 1897 and February 1898. We have answered by mail giving full particulars.

Pyralin.

Editor Textile World:

I notice that there is a company being formed in Woonsocket, R. I., which is to make use of a patent material known as Pyralin. Will you please inform me what this article is?

Pyralin.

We think that this article, from what we can learn about it, is the same as Pegamoid, which is a prepartion sometimes used on cotton cloth for giving the surface a peculiar finish. It is mostly used, however, for making imitation leather, using cotton cloth as the foundation. The company controlling the article called Pegamoid has its office in the Bowling Green Building (second floor), New York City.

Knitting in California.

Editor Textile World:

Will you kindly inform me, as early as possible, if there are any knitting factories located in San Francisco or in the State of California, and if so, how many and what kind of goods they manufacture. If there are none in the State of California, which is the nearest place to San Francisco where there are knitting factories; the size of same and the kind of goods they produce. Furthermore, I should like to know if yarns of all kinds, such as cotton, woolen and worsted, can be obtained at San Francisco in large quantities for knitting purposes, and if not, where is the nearest place where the same can be gotten either direct from the mills or through an agent.

A Westerner.

There are five mills in California with knitting machines. Three of them are in the city of San Francisco. One, we believe, makes fancy knit goods, including golf hose. Another mill at Oakland, Cal., makes bicycle and golf stockings. It has 10 machines. When we were compiling our 1898 Directory, they reported the mill as idle. The largest concern is the J. J. Pfister Co. in San Francisco, which has 36 machines. We do not know how many are employed on golf hose, nor can we inform you the approximate quantity manufactured. There are several small knitting mills in Oregon, but none in Nevada, to our knowledge.

So far as we know, there is no cotton or worsted yarn manufactured on the Pacific Slope, except that in Oregon there is one mill making worsted yarn for its own consumption. There are several woolen mills from which yarn could probably be obtained for knitting purpose. There are also several silk mills, which produce knitting silks. You could undoubtedly make arrangements for purchase of all kinds of yarn in San Francisco through agents. The nearest worsted yarn manufacturers would be in Wisconsin and Kentucky.

Army Goods.

Editor Textile World:

I want to submit samples of 6/4 dark blue, all wool, 10 to 16 oz., blouse linings, and also 3/4 blouse linings and blankets, to the government for army purposes. Can you tell me where I can submit these samples in order to secure a government contract?

Illinois. G. H.

We would suggest writing to the Quartermaster General of the United States Army, Washington, D. C.

Black for Cotton Yarn.

Editor Textile World:

I desire a good recipe for fast black on cotton yarn, one that will not make the yarn tender. Can you give me any suggestions in this line? I send you a sample of yarn that I am using, but it is tender.

Connecticut T. H. M.

The sample which accompanys this inquiry was apparently dyed with either an aniline salt black, or an aniline oil black. The process for thus dyeing is well known, but to give perfectly satisfactory results, one should be quite familiar with its proper manipulation. In fact, a competent aniline salt black dyer is a sine qua non. Some dyers are using diazotized and developed blacks in place of salt. We have replied more fully by mail. We will add, however, that if our correspondent will address his wants to our advertisers, we are absolutely certain that he will obtain some excellent advice.

Silk Heel and Toe.

Editor Textile World:

We enclose herewith a sample stocking which you will note is black worsted with the top of the toe yellow silk and also the tip of the heel. We would like to know how this is made. Is the worsted knit in the grease and then the colored silk run in and the whole then dyed black, the worsted yarn taking the black and the silk not being affected; or, is the worsted yarn dyed black before knitting and then the yellow silk heel and toe transferred. Thanking you in advance, we remain.

N.H.

Your sample is such a perfect piece of transferred work that we do not wonder at your doubt. This stocking is, however, knit from black worsted yarn on a double ribbed machine (one and one) down to the ankle, then transferred to a seamless machine and knit to the heel, about two-thirds of which is silk. The same procedure is followed with the toe. It would be impossible to knit this stocking in the grease (or white) entirely, and then dye it black and preserve the lustre upon the silk which this sample has. By close observation, you will notice on both heel and toe where the silk has run out and run in, in the knitting, but it is a perfect piece of work. We should think it would be quite difficult to get operators to do this work, as it is very trying on the eyes to transfer work (especially black) in colors.

Internal Revenue.

Editor Textile World.

From what sources do the United States obtain their internal revenue?

Ohio. C. R.

The sources of internal revenue are as follows: spirits, which include those distilled from various materials, special tax on retail and wholesale liquor dealers, etc., tobacco; fermented liquors; oleomargarine; filled cheese; playing cards; and other small items. Over thirteen million dollars were thus received for the month of March last.

Consumption of Fibres.

Editor Textile World.

Can you tell me whether Mulhall's figures, Dictionary of Statistics, page 366, the total weight of fibres consumed in manufactures in 100 years, down to 1880, are at all reliable for purposes of comparing the increase of these manufactures from decade to decade. If not, is there any reliable English authority from which such information may be obtained.

Ithaca, N. Y. S. F.

Of course, in order to show the correctness or incorrectness of any author's statistics, it becomes necessary to quote some higher authority, and this would be difficult to do in regard to the statistics found in Mulhall's Dictionary. If there is any authority better than Mulhall's on cotton or wool, it would be Thomas Ellison or Helmuth Schwartze & Co. We find upon examining the figures for several of the decades covered by Mulhall, that the latter's statistics agree with those of the authorities we have just named, and therefore, must assume that Mulhall's statistics in full are as correct as any that are obtainable. In regard to flax and other fibres, we certainly should consider Mulhall's as good, if not better than any other.

Water Column.

Editor Textile World:

I leave boiler room after stopping pump, with two gauges of water in boiler, upon returning a short time later, find glass full; give water column, gauge glass, and try cocks a blow through, the valves on gauge glass are open and clear, still water stands at top of glass and the three try cocks show water. How can I find water level without shutting down? What would be the cause and how would the water act?

Cambridge, Mass. L. P. J.

Three conditions may exist which will cause the water to stand at the top of both glass and water column, namely: Boiler full of water, top connection between water column and boiler stopped up, and lower connection between water column and boiler closed.

Any one of the above conditions will show a full glass and column, and may be easily distinguished from one another, by the action of the water upon opening the valve in the pipe which drains the water column.

Suppose the glass to be full and try cocks all show water. If upon opening drain valve of water column, the water does not fall in glass, and try cocks show water when opened, this would indicate that the upper connection between boiler and water column was closed.

If the water fell and did not return upon closing drip valve, it would indicate that the lower connection was closed.

If the water fell and did return when the drain valve was closed, it would show the water line of the boiler was above the top connection, or boiler dangerously full of water.

It is assumed that the pipe which drains the water column is large enough to allow water to be blown entirely out of the column when under normal conditions.

Lining Up an Engine.

Editor Textile World:

How would you go to work to line up an engine?

Chicago, Ill. C. B.

Space will not permit in these columns of more than an outline of the method of procedure.

Remove cylinder head, piston, piston rod, cross head and connecting rod.

Fit a pine board about 3 inches in width, across the center of head end of cylinder; locate the center of cylinder on the board and bore a hole in same about 1¼ inches in diameter.

One end of the line is then attached to a short piece of stiff wire or say ¼ inch round iron, and passed through the hole in the board, while the body of the line extends through the cylinder guides and out past the crank shaft being secured so that the center of the line is exactly the same height as that of the crank shaft.

Now by means of a slender pine stick about one inch shorter than half the diameter of cylinder, a pin protruding about one-half inch from each end proceed to center the line at the head end of cylinder. When this has been done center line as it passes through stuffing box.

Great care must be taken with measurements, going over them several times.

When satisfied of the correctness of the work take the guides next, measuring from the bottom only, as the line must be parallel to but not necessarily in the center of the guides.

Make no changes until all parts have been considered. Proceed next to the crank shaft; turn the engine over to the head center, and note by measuring just where the line touches the crank pin; turn over to opposite center, note difference if any. If there is considerable difference go over the measurements of the cylinder again and when satisfied that the line is correct, make necessary changes.

A plumb bob and line established perpendicular to the line through centers, may be used to level the crank shaft in the same way that the center line is used to line up shaft.

Main bearings should be set up snug so as to prevent play from causing errors in measurements.

When calipering the distance between line and cylinder measure from the counterbore and not from the working surface of cylinder which may be worn.

Incandescent Lighting.

Editor Textile World:

I have an arc light dynamo which has been running six arc lights, each lamp requiring 40 volts and 18 amperes. How many 110 volt incandescent lamps can I run with it and how should they be connected so as to do away with the arc lamp?

New York Mills, N. Y. A. B.

The arc light machine referred to as a six light dynamo would in all probability deliver not more than nine amperes and forty volts to each lamp, in which case the machine would be a 120 volt, 18 ampere dynamo, see Fig. 1.

For incandescent lamps, the machine should be connected as shown in Fig. 2, and would then run 36 lamps of 16 candle power, under a pressure of 120 volts, the lamp being connected in multiple across the line. If however, each lamp actually takes 18 amperes and 40 volts, as shown in Fig. 3, it is a 240 volt, 18 ampere machine. In order to connect incandescent lamps on this arrangement it would be necessary to connect two in series across the line, and by this arrangement 72, 16 c. p. lamps could be connected within the capacity of the machine, as shown in Fig. 4.

It would be necessary to run the dynamo at a slightly reduced speed in order to keep the pressure down to 110 volts per lamp in either case. As the arc machine is series wound, it will not regulate well for incandescent lamps, that is, if all the lamps were burning and a portion would be turned off, the remaining lighted lamps would probably be burned out by the excessive pressure; nevertheless by varying the speed you could get the desired illumination.

Capacity of Duplex Pump.

Editor Textile World:

Will you kindly explain how to figure out the cubic contents of duplex pump cylinders 5½ inches in diameter, 7½

inches length of stroke and 10 strokes per minute?
Perth Amboy, N. J. A. S.

First find the area of the piston in square inches, thus: $5\frac{1}{2} \times 5\frac{1}{2} \times 0.7854 = 23.75$ square inches = area of piston. Multiplying this by the length of the stroke, as $23.75 \times 7\frac{1}{2} = 178.12$ cubic inches or the cubic contents of one cylinder.

As the cylinder only fills about 4-5 or 80 per cent. of the stroke, the amount of water pumped per stroke will be $178.12 \times 0.80 = 142.5$ cubic inches, $142.5 \times 10 = 1425$ cubic inches, the amount of water pumped per minute by one cylinder, and as there are two cylinders, the total amount of water pumped per minute will be twice this. $2 \times 1425 = 28.50$ cubic inches.

As there are 1728 cubic inches in one cubic foot, then $2850 \div 1728 = 1.65$ cubic feet.

New Publications.

Commercial Year Book. 1898. New York: Journal of Commerce & Commercial Bulletin. Price in cloth, $1. This is the most complete statistical annual that is published in this country, relating to industries, agriculture, banking, currencies, commerce, investments, railroads, shipping, insurance, army and navy, population, etc. in the United States and foreign countries. The fact that it is published by this well known commercial paper stamps it as of the highest authority. Those at all interested in the statistical status of the subjects referred to, should not be without this valuable work. Its information is classified and arranged so that anyone can get at the matter that he desires to reach, quickly and intelligently.

Ashenhurst's Cloth Structure Tables, compiled on strictly scientific principles by Thomas R. Ashenhurst. Published by author. Price $1.00. These tables are totally different in character from any previously published, are arranged in convenient form, and show at one glance the number of ends per inch to be put in a cloth for any count of yarn or any combination of counts in any material or combination of materials. The tables are five in number, for worsted warp and worsted weft, cotton or spun silk warp and weft, cotton or spun silk warp and worsted weft, woolen warp and woolen weft, and cotton or spun silk warp and woolen weft. In each count of yarn, or combination of counts, the minimum and maximum number of threads which may be used in a cloth are given, and the number which will produce the most perfect structure, so that at one glance the margin of extremes from the perfect structure may be seen. The tables are based upon a long series of micro-metrical measurements and experiments, extending over a number of years, and amply verified by tests of known cloths, and may therefore be relied upon as correct. The tables are so simple and easy of reference that any one can construct a cloth from them and know to a certainty what degree of perfection he will attain.

Cassier's Magazine for May. New York. The Cassier Magazine Co., price 25 cents per number. Much space is devoted to articles relating to the navy. Among them, with others, may be mentioned the following: Wire Ropeways—Different types and their uses; Nickel Steel Armor in the United States—How it is made and what it costs; Present-Day Shipbuilding Problems—The next great advances in scientific naval architecture; Raising Wrecks in the Thames—the history of a triple wreck; Compressed Air in Mining—Its advantages over steam and electricty; A Short Talk on Patents—Patent rights in different countries.

War Atlas. Chicago: Rand, McNalley & Co. Price 25 cents. This publishing house has just issued an atlas that should be of special interest to Americans at this time, while the United States is in war with Spain.

The Berry Wheel. A. Hun Berry, Boston, Mass., has issued a small pocket pamphlet relating to his ventilating wheels or fans, containing much information of value to those desiring an apparatus of this kind. The use of ventilating wheels or fans is now so universal that few, if any, manufacturers can be found who have not one or more of them. The Hun Berry wheel is used either as an exhaust or forcing fan for drying fabrics or materials, or for the discharge of steam, dust, hot or foul air, or gases, the ventilation of rooms or buildings, etc.

Paranatraniline Red. Wm. J. Matheson & Co., 182 Front St., New York, have issued a pamphlet, with specimens, showing a new method of discharging developed Paranatraniline Red, as a self shade and in combination with diamine colors. This discharge is represented as not only producing excellent white and colored effects on Paranatraniline, but also has the property of discharging at the same time diamine colors dyed with the Paranatraniline.

The Sturtevant Engine. The B. F. Sturtevant Co., Boston, Mass., have just issued an illustrated catalogue of their engines for electric plants, etc. These engines have been built to meet a demand for a machine capable of sustained operation at high speed, possessing the utmost refinement in the matter of speed regulation, and in developing the maximum H. P. with a minimum weight and floor space. The company have for many years devoted themselves to the most careful design and development of a line of simple, compact and absolutely high grade engines. These engines are unique in many features, and are especially adapted for dynamo driving and similar refined and continuous work. We would suggest parties sending for the catalogue.

Machinery for Bleaching, etc. H. W. Butterworth & Sons Co., Philadelphia, have issued a catalogue handsomely illustrated, of their machinery, devoted to the bleaching, printing, dyeing, drying and finishing of textile fabrics. We would suggest to those interested in this kind of machinery, employers as well as employees, to write for this catalogue, as it is instructive in many particulars, furnishing many practical suggestions.

Appleton's Popular Science Monthly, for June. New York: D. Appleton & Co. Price $5 per year. In the June number of this excellent magazine, appears the first of a series of very important educational articles, on Manual

Training. In this issue, there appears other valuable articles, such as the following: The Indians of Southern Alaska; Veracity (The writer of which attempts to show that the persons to whom we lie most often are ourselves); Atavism (showing a natural tendency to this state of existence, which oftentimes leads to surprising results even in the human family); Sahara Desert (which is interestingly illustrated).

Excelsior Lake Scarlet JN and 2 JN Oxy-Diamine Black A and D. Circulars relating to these dyes have been issued by W. J. Matheson & Co., New York. The former possesses great tinctorial power and produces bright, brilliant shades, especially adapted for producing red pigments. It may be used alone or in combination with other lake scarlets and oranges. The latter is especially suitable for producing cheap blacks on cotton.

Cassier's Magazine, for June, 1898. New York: Cassier's Magazine Co., Price 25 cents per number. This number has handsomely illustrated articles, bearing especially upon our war fleet and naval vessels. Among them may be mentioned the following: The Ram in Modern War Fleets—in combat and collision. The British fleet. In the French, Italian, and German fleets; Modern Ships of War—a brief review of different types; The Spanish Armada—its defeat in 1588; Some Practical Notes on American Battleships—as seen by "The Man Behind the Gun;" and Battleships of the United States Navy—a review of the ships now in service; Mechanism of Modern Naval War, the increasing complexity of modern naval vessels.

Industrial News.

—Victor Koechl & Co. have removed their New York office and warehouse to 122 Hudson St., where they occupy the whole of a large six story building.

—The major portion of the worsted machinery for the extension of the mill of George C. Moore, at North Chelmsford, comes from Prince Smith & Co., Keileigh, England, of which Stoddard, Haserick, Richards & Co., of Boston, are the American agents.

—The new power station and car house being erected by the Spencer, Warren & Brookfield Street Railway Company, at Brookfield, Mass., will have steel roof trusses and covering furnished by the Berlin Iron Bridge Company, of East Berlin, Conn. The dynamo and engine room roofs of this building, will be lined with the Berlin Company's patent anti-condensation roof lining, which is now almost universally used for roofs of this nature throughout the Country. It prevents the condensation of moisture from the underside of the roof covering, which if it should collect and drop upon the machine beneath, would cause considerable damage.

—John S. Adriance, analytical and consulting chemist, 105 East 93th St., New York, is meeting with excellent support and encouragement from manufacturers who have engaged his professional services for the examination of mill supplies. Mr. Adriance is regarded as one of the most careful and skilful analytical chemists in this country.

—Commencement exercises of the Pennsylvania Museum and School of Industrial Art were held at Horticultural Hall, Philadelphia, June 9. Many took advantage of the occasion to inspect the work of the students of the school of applied art and of the textile school, at the school building, Cor. Broad and Pine Sts.

—The Berlin Iron Bridge Co., East Berlin, Ct. have just completed a fire-proof boiler house for the Hendey Machine Co., Torrington, Ct.; and has just furnished material for a new casting shop for the Whitin Machine Co., Whitinsville, Mass. It has just completed for the Conway Electric Street Railway Co., Conway, Mass. a steel 300 foot bridge, to carry their electric line across the Deerfield River.

—The William Corey & Co. of Manchester, N. H., manufacturers of knitting machine latch needles, are building a brick addition to their shop 30 ft. long and three stories high, which will be used for office and store rooms.

—J. H. Lyon & Co., dealers in all grades of paper and woolen manufacturers materials, have their office and warehouse now located at 174 Duane St., near Hudson St., New York City.

—Pulver & Sons, 214 Franklin St., New York, have long been engaged in the manufacture of patent compounds, to be used as substitutes for oil, in the lubrication of machinery. They now have upon the market an article that is spoken of by those who have used it, as being superior, and which the manufacturers guarantee to effect a great saving and give entire satisfaction in every particular, where cool, clean, light-running machinery is desired. It may be well to state that this concern's compound should not be confounded with the many different styles of transparent or paraffine products that are sold under the head of lubricating greases, as their article is a cream colored, opaque compound, composed of the highest grade of animal oils and greases compounded with non-gumming waxes and other substances necessary to produce the proper cooling and wearing body essential in a first class lubricant.

—The Thomas Phillips Co., machinists and coppersmiths dyeing and finishing machinery, cylinder slasher machines, Providence, R. I. have sent us a catalogue of their machinery, fully illustrated. Parties interested in such machinery would do well to send for this catalogue, as it furnishes much interesting reading aside from the special machines referred to.

Automatic Feeds and Oilers.

George S. Harwood & Son, 53 State St., Boston, Mass., manufactured and supplied the machinery here named to the following mills: Wolfenden, Shore & Co. have put in new Spencer automatic wool oiling machines for oiling stock on the feed table of the picker, instead of on the floor with a water-can, which is found to be a great saving of oil, labor and waste. The Belleville Manufacturing Co., Belleville, R. I. have equipped their card room with six Apperly feeds. The Matteawan Manufacturing Co., Matteawan, N. Y., have put in a picker feed for mixing, blending and feeding stock on a burr picker. The Jefferson Manufacturing Co., Jefferson, Mass., have put in Apperly feeds of improved construction, on their finishing cards. Adler & Co., Cincinnati, Ohio, have put in ten Bramwell card feeds. The Assabet Manufacturing Co., have put in two Bramwell worsted feeds. The Indian Spring Woolen Co. have adopted the Spencer automatic wool

oiling machine. Stephen, Sanford & Sons, Amsterdam, N. Y. have added three Bramwell feeds of special construction, and great capacity for feeding wool dryers. The Passaic Wool Co., Passaic, N. J., have added improvements to their Bramwell feeds and brought the machines thoroughly up to date. The Farwell Worsted Mills, Providence, R. I., have put in new carding machines with improved Bramwell and Apperly feeds. J. & R. McLaren, Cohoes, N. Y. have remodeled their Bramwell feeds with new improvements. The Riverside Woolen Co., Stafford Springs, Ct., are highly pleased with their improved Spencer automatic wool oiler. Thomas Dolan & Co., Philadelphia, have put in improved picker feeds and several of the Spencer automatic wool oiling machines. The Mishawaka Woolen Manfg. Co., Mishawaka, Ill., have added a number of Bramwell and Apperly feeds of improved construction, built with special reference to their work. The Botany Worsted Co., Passaic, N. J., are more than satisfied with their Spencer automatic oiling machine. L. E. Harrower, Amsterdam, N. Y., has put in an improved Bramwell feed of special construction, to feed a garnett machine. W. S. Taylor & Bloodgood, Jr., New York, have supplied themselves with improved Bramwell and Apperly feeds, of special construction. The Philadelphia Textile School, Philadelphia, Pa., have recently received a special Bramwell feed for a new card they are about to start up at the school.

Dust System.

The Allington & Curtis Mfg. Co., Saginaw, Mich., with eastern factory at No. 29 Otis St., East Cambridge, Mass., are meeting with flattering success for their dust system for textile mills. Especially does it seem applicable in connection with the running of napping machines, the dust-conducting pipes being arranged so that they are not in the way, and not objectionable in any particular. The collecting fan discharges the lint or dust into what is called a cyclone collector. This system is adapted to control most of the dust problems connected with textile mills. Among the mills that are using this system may be mentioned the Methuen Co., Methuen, Mass.; The Pemberton Co., Lawrence, Mass.; Amoskeag Mfg. Co., Manchester, N. H.; Wm. Hooper & Son, Baltimore, Md.; Fitchburg Duck Mills, Fitchburg, Mass.; Cocheco Manufacturing Co., Dover, N. H.; Massachusetts Cotton Mills, Lowell, Mass.; Lancaster Mills, Clinton, Mass.; Thos. Henry & Sons, Philadedphia, Pa.; Merrimack Mfg. Co., Lowell, Mass.; Sawyer Woolen Mills, Dover, N. H. This company also manufacture fans for all purposes.

The Acme Knitter.

The Acme Fully Automatic Knitter, manufactured by the Mayo Knitting Machine & Needle Co., Franklin, N. H., has been, or is being, placed in the following mills: The new hosiery mill being erected by the Black Diamond Knitting Mills Co., Nanticoke, Pa.; the hosiery mill of A. Boyle & Bro., Philadelphia; Thomas West, Plymouth, Pa.; H. A. Romberger, Middletown, Pa.; Fisher & Jones, Lykens, Pa.; Des Moines Mills, Des Moines, Ia.; The Sulloway Mills, Franklin, N. H. The Mayo Knitting Machine & Needle Co., are now thoroughly equipped to make a first class line of latch needles of all kinds. Their needle department which is fitted with the latest improved machinery is in full operation, and the knit-goods manufacturers would do well to give their product a trial.

Seashore "Scare" is Passing.

Summer Dwellers at the Beaches Gradually Losing Their Fear of That "Spanish Invasion."

As time passes, and the real position of the Spaniards in the present war becomes apparent, the groundless nature of the "scare" that at one time threatened to depopulate the seashore resorts of New England during the coming summer begins to impress itself upon the public mind. As a veteran military man remarked the other day, there never was any real basis for the alarm, for it must have been evident to any one who stopped to reason out the situation, that a descent upon the North Atlantic coast of the United States, located thousands of miles away from the nearest base of fuel and supplies, patrolled by vigilant Yankee warships, and protected by numerous fortifications and mines, would be the last thing any sane Spanish admiral would think of undertaking.

It was evident at the outset, as it certainly is now, that the Spaniards realize they are in no condition to indulge in any such suicidal expedition as this. They have all they can do, and more, to take care of themselves; and whatever the immediate outcome of the present naval operations may be, the chances that any of the Spanish ships will get within a thousand miles of New England's rock shores are very, very remote.

"This seashore scare," said a prominent railroad man, "makes me exceedingly tired. It is absurd and unwarranted on the face of it, and the sooner people get over their foolish fear about a Spanish invasion the better. The man who intended to rent a summer cottage at the beach, or spend his annual vacation at one of the summer resorts, will not be justified for a moment in changing his plans on that account. He will not be doing himself any credit, and he will be helping to do a rank injustice to those who have made their usual plans to cater to his comfort and convenience this summer."

It looks now as if the public was coming around to the view of this gentleman, for the transportation and hotel people report that the "scare" has already largely subsided.

Lubrication of Gas Engine Cylinders.

The proper lubrication of gas engine cylinders has been a very difficult problem. The problem however, seems to have been very successfully solved by an official of the Pennsylvania Railroad Co. He writes as follows:

"I had a gas engine at Sharon, Pa., running a pump, and the man that had charge of it allowed the lubricator to run dry and cut the piston, piston rings and cylinder. The makers of the gas engine said the cylinder would have to be sent to the shop and bored out and a new piston put in. It was our busy season and we could not do without water. I had some of Dixon's finely pulverized graphite, and I commenced to feed it into the cylinder through the suction pipe with the air and gas, with immediate relief. After about two weeks the engine was running smoother and using less gas than ever before. I had this same engine apart and every place that was cut is smooth as glass. This one instace saved us about $75.00. I have great faith in this graphite and always keep it on hand."

Textile Patents.

Phillips & Anderson, patent attorneys, and solicitors of patents, Exchange Building, Boston, Mass., have recently secured the services of Horace Van Everen, who, for a number of years and until recently, has been an examiner in the United States Patent Office in the divisions of metal working and textiles. Mr. Van Everen, while in the Patent Office, examined many applications for important inventions in textile machinery and made a thorough study of patents and inventions relating to such machines, and has an expert knowledge of all matters appertaining to textile inventions. Phillips & Anderson are especially expert in inventions relating to the boot and shoe art, but they have within the last year solicited many important inventions relating to textile machinery, and inasmuch as their business in this line has been steadily increasing they have deemed it necessary to secure the services of an expert in textile machinery to assist them in this branch of the business. They are, therefore, at present in a position to render valuable services to inventors and others interested in inventions relating to the textile art.

American Turbine Wheels.

In a recent number of Cassier's Magazine, a Swiss engineer makes an interesting comparison of methods of turbine building in Switzerland with those of this country in which he says: "The difference briefly stated, is this, that American turbines are almost exclusively wheels with inward flow and axial discharge, while European turbine builders prefer parallel flow wheels. Further, American turbines are built in fixed standard sizes, whatever the conditions under which they are destined to work may be, whereas European engineers design their turbines to suit the local conditions and special requirements of each case."

Commenting at length upon this article, the Investigator of Keen, N. H., remarks that while the inward raidal-flow turbine has certain advantages over the other types, either type, by proper consideration, may be susceptible of high efficiency and each has had its admirers and advocates. Relative to the neglect of adaptation of wheels to conditions of use the Investigator says "While it may be the custom with some builders to use the same patterns for all places, it is certainly not entirely so, as such adaptation is not wholly unknown in America. It is a matter, however, which should not be overlooked in designing turbines, as the length and curvature of floats of wheels used under different heads, or for variable loads should be suited to the special service, if best results are desired."

The making of wheels of small diameter in relation to the volume of water to keep the price down has undoubtedly lead many American builders to ignore important principles.

American Worsted Machinery.

The Lowell Machine Shop, of Lowell, Mass., has been very successful in securing orders for their new line of worsted machinery and are quite busy. In Lowell, their machinery is running in the mill of the Massachusetts Mohair Plush Co., where it can be seen by interested parties. They are shipping cap spinning to the Woonsocket Worsted Mills, and will shortly have machinery running in the Star Worsted Co.'s mill at Fitchburg. The Lowell Mfg. Co. has also recently placed an order for some of their worsted spinning.

The Raveler Litigation.

Since 1892 there has been almost constantly in the United States courts and in the patent office litigation between A. L. Traver and his successor, The American Raveler Co., and Eugene H. Brown and his successor, the Union Raveler Co.

It is to be regretted that in a field, which has its limitations, that the trade should have been kept in such a state of uncertainty as to the status of this matter. It seems to us that it must have resulted to the detriment of each concern. Manufacturers are naturally somewhat timid about "buying a law suit" with a machine even although the manufacturers of the machine assume all expenses and responsibility.

The Union Raveler Co., through its counsellor, Franklin Scott, of North Bennington, Vt., has lately undertaken to present a short history of the Raveler controversy in a circular in which various suits are set forth and explained and in the summing up it is alleged that the general effect of the decisions up to date, has been in favor of Brown and the Union Raveler Co. and against Traver.

These circulars can be had on application to Mr. Scott and may be of interest to many in the trade.

The National Association of Overseers.

The National Association of Woolen and Worsted Overseers held its semi-annual meeting at the United States Hotel, Boston, May 18. A large number of delegates were present.

The following new members were elected: To active membership, Eleazer Davis of Plymouth, Frank J. Denice of Manton, R. I., John E. Sinclair of East Rochester, N. H., and John R. Simpson of Manton, R. I. To honorary membership, Frank Pearl of Worcester, Arthur Parkinson of New York and Thomas E. Ainley, instructor in the Lowell Textile School.

Supt. D. P. Scribner of the Yantic woolen mills of Yantic, Ct., spoke on "Facts and Figures of Woolen Manufacturing in This Country for the Past 75 Years." "Carding and My Experience with Different Carding Machines," was the subject of an address by Charles P. Madden of Lawrence.

Albert E. Jones of Uxbridge spoke on colors and mixtures. He said that this work called for careful attention. No part of the dyehouse calls for greater anxiety than the effort to bring about some particular color or shade of a color. He gave a description of the work in the dyehouse and emphasized how difficult it was in blending perfect shades.

A paper prepared by Edward Greaves of Moosup, Ct., and read by Arthur Greaves of Bridgeton, R. I., was on the subject, "Wool."

New System of Incandescent Lighting.

Great interest is always shown by the public, and especially by those operating factories, in the advances or improvements made in the methods of artificial lighting. A system has recently been introduced that has given excellent satisfaction wherever used, in this country as well as abroad. It is known as the Washington System of Incandescent

Lighting, operated under U. S. patents, issued during last year. The system has been approved and adopted by the French and Belgian governments, as possessing superior merits and furnishing perfect illumination of great brilliancy and power at a very low cost, an end towards the solution of which the efforts of inventors have been largely directed. The Washington incandescent lamp consumes kerosene oil without wick or chimney, and the cost of maintenance is represented as being almost nothing. The oil is turned to incandescence. It is employed in the Boston Globe's press rooms, where an illumination is required equalling 30,000 candle power. This is sustained we are informed, by the Washington System, at a total expense of only $1.40 per night. It is claimed that a large manufacturing building might be lighted ten hours a night for $1.40, by this system. It is the purpose, later, to manufacture lamps of 500 and 100 candle power for use in dwellings. For the maintenance of the latter power, it is stated that the cost would not exceed that of a tallow candle, and the cost of running one of the 500 candle power lights would be about one cent per five hours. The combustion, it is stated by those who have had experience with the lamps, is practically perfect, no soot or smoke coming from the lamp. We are informed that the system is in use in the stations of the four leading railway lines of France. It has been put in the lighthouses on the Brittany coast; and in one lighthouse it supplies lamps of 42,000 candle power. Portions of some of the large boulevards in Paris are lighted with it. It is used in some of the largest factories in Paris, being in one establishment where 2,000 men are employed. In Brussels, it is commonly, if not generally used, being in places of amusement, cafes, and a large number of private residences. The head office and factory is at 68-78 Flushing Ave., Brooklyn, N. Y., and the New York office at No. 1 Nassau St.

A Yarn Decision.

An instance of the care which is given by the U. S. patent office in the consideration of new inventions, has just been furnished in a case in which J. R. Leeson & Co. of Boston, are interested. The application for protection was upon a system of winding yarn for knitting and other purposes. The case has been under consideration for more than five years, and the favorable decision of the patent commissioner securing the rights of the inventor, is an example in brevity and conciseness.

The decision consists of less than 10 lines, and closes thus:

"The patent, which is the subject of this application, is an invention of a character which, under the public statutes, is entitled to protection. It is true that the invention is a very simple one, but it is not an obvious one, and it moreover appears to be very valuable."

The Universal system of winding to which this applies, is revolutionizing the winding of fine yarns, and is being rapidly adopted by up-to-date mills, being now in successful operation in some of the most important yarn spinning establishments in the country.

North Conway and the White Mountains.

The American Institute of Instruction will hold its next annual meeting in North Conway, New Hampshire, July 5-8, 1898. Are you going?

It promises to be one of the largest and most enthusiastic meetings the Institute has ever held. The program is one of exceptional interest, embracing topics and naming speakers sure to be helpful and stimulating to school officials and teachers of every grade. Manual and Moral Training, Art and Science Culture, Human Interests in Nature Study, How to Manage Troublesome Children, Child Study, Woman's Place and Power in Educational Affairs and the Present Status of Education in New England are among the topics to be presented and discussed by the most distinguished and progressive educators, both men and women, from every New England State.

North Conway occupies a first place in the hearts of tourists and sojourners. No greater variety of mountain views and mountain climbing can be found anywhere. In North Conway and the adjoining villages over two thousand guests can be easily accommodated and in the numerous attractive places near as many more, all within sight of, and a day's journey to Mount Washington and other reachable mountain summits. The local arrangements were never more complete and satisfactory. A reception committee upon application will secure entertainment at any price desired.

Hotels and railroads offer generous reduction in rates, and two afternoon excursions, A Tally-Ho and Crawford Notch by rail, at merely nominal prices, will be greatly appreciated.

For particular information as to program, railroad and hotel rates, excursions, etc., send to the treasurer, Alvin F. Pease, Northampton, Mass., for the sixteen page bulletin already issued.

Personals.

Cotton.

—P. J. Quinn, the well known dyer, formerly of North Adams, Mass., has removed to Rockville, Conn., and accepted a position in the Rockville Warp Mills Co.

—John Schofield, formerly of Athens, Ga., has accepted the superintendency of the Alpha Mills, Charlotte, N. C.

—Ernest Bromley has been engaged as designer for leno, lappet and jacquard work at the Grinnell Mfg. Co., where L. W. Powers has charge of the weaving.

Deaths.

—D. W. Crockett, of Halifax, N. S., died recently from heart failure; aged 62 years. Mr. Crockett was secretary and manager of the Hopewell Woolen Mill Co. until it was destroyed by fire about 10 years ago.

—John H. Mullen, woolen manufacturer of Stafford Springs, Conn., died recently, age 29 years.

—Zenas Cushing died recently at his home in Ipswich, Mass., aged 84 years. He was treasurer of the Ipswich Woolen Mills from their start to their purchase by the present management.

—Harry Deacon died May 27th at his home in Newport, R. I. after a short illness of pneumonia, age 41 years. Mr. Deacon was born in England, but has lived in this country for a number of years. About a year and a half ago he accepted the position of overseer in the weave room at the Newport Woolen Mill.

MILL NEWS.

Cotton.

New Mills.

—Alabama, Tuscaloosa. The Tuscaloosa Wadding Co. is the name of the new company to build here. The officers of the company are pres., E. B. Muzume; treas., Francis Brady; supt., D. J. Griffin. Capital is $25,000. They expect to start production August 1st, employing 50 hands, and are in the market for machinery.

—*Arkansas, Little Rock. The Thomas Cotton Mills Co. is the name of the new company mentioned last month, of which Dr. A. D. Thomas is pres.; Maxwell Coffin, treas.; and J. M. Haney, supt. Foundations for new building, 375 x45, were started April 1st, and they expect that production will begin in August or September; employing 85 hands, using steam power. Product will be knitting yarns, carpet warp, mop yarn, small rope for clothes' line, and wrapping twine. They will have 37 cotton cards, 3,000 spindles and 10 duck looms.

—*Georgia, Dalton. The Crown Cotton Mills are now ready to start work on their new mill of 10,000 spindles and about 260 looms, having arranged with the city council for an additional water supply necessary. This increase was proposed last autumn. Their product is cotton duck, which will be doubled by this new mill.

—North Carolina, Gastonia. The proprietors of the Modena Cotton Mills will build another mill to be known as Modena Mill No. 2. Equipment will be about 6,000 spindles. Product will probably be largely yarns of fine numbers. Work on the building will soon be started.

—*North Carolina, Kinston. The main building of the Kinston Cotton Mills has been started, and work will be pushed forward. This plant will have 5,000 spindles, and we understand that most of the machinery has been purchased. The product will be hosiery yarns. As mentioned last February, this company has a capital at the start of $55,000.

—*North Carolina, Mayodan. The new cotton mill proposed for this place will probably not be built for several months. This mill will be known as Mill No. 2 of the Mayo Mills.

—North Carolina, Rockingham. We are informed by the Pee Dee Mfg. Co., that work on their new mill will be started soon. This is to be a separate structure, equipped with 6,000 spindles and 300 looms. They will have 24 cotton cards. The product will be plaids. They will have equipment for raw stock and long chain dyeing. About 250 hands will be employed. W. C. Leak is president of this company, William Entwistle, superintendent.

—*Texas, Pittsburgh. It is now reported that this town has interested Northern capitalists to build a cotton mill, at a cost of about $100,000. It will be remembered that in March local parties offered to raise $25,000 towards this project.

Enlargements and Improvements.

—Georgia, Augusta. The Sutherland Mfg. Co. has ordered 10 Howard & Bullough cards; three drawing frames; two slubbers; one intermediate; two Fales & Jenks speeders and some other new equipment.

—*Georgia, Augusta. The new mill of the John P. King Manufacturing Co. is now nearly ready to start in full operation. The company will have a total of 60,000 spindles and 1812 looms.

—Georgia, Barnesville. The Barnesville Mfg. Co. is erecting a repair shop for repairing its own machinery.

—Georgia, Covington. The Porterdale Mills have let contract for an addition to their mill to cost $150,000. Their present mill has 5,000 spindles and it is understood that the new mill will have 15,600 spindles and employ 500 hands. This is to be built further up the stream, and will use water power.

—Georgia, Roswell. The Roswell Mfg. Co. will operate their mill No. 2 nights and have purchased a new boiler and engine of 175 h. p. to provide for this. This plant has 12,000 spindles. Product is yarns, 8's to 22's.

—Georgia, Stone Mountain. The Annestown Cotton Mills will build an addition which will increase their product from 1200 to 1500 pounds daily. A small knitting mill is also under consideration. C. J. Haden, president, 303 Equitable Bldg., Atlanta, Ga., should be addressed.

Mills Starting Up.

—*Tennessee, Elizabethton. The Tennessee Cotton Mills, of which M. E. Clark, is general manager, started up its new mill May 9th, employing about 50 hands.

Woolen.

New Mills.

—*Maine, Phillips. We understand that over $4,000 has already been pledged toward rebuilding the woolen mill by Hescock & Atwood, which was burned March 7th. $5,000 is the amount wanted.

—Massachusetts, Concord Junction. The Massachusetts Reformatory has purchased looms and other equipment and will operate a 2-set woolen plant for making cloth used in various state institutions. All the weaving is to be done by hand looms.

—*Massachusetts, Haverhill. Alexander Roberts & Co., recently burned out at Rosemont, will not locate at North Paris, as was recently reported, but have already leased room and power in the Duncan Bldg., Hale St., Haverhill, and have started up. They employ 30 hands and operate 15 broad looms and one narrow loom. Product is men's wear, trowserings and worsted suitings.

—New Jersey, Paterson. Vreeland & Lowe is a new firm recently organized to manufacture Scotch plaid and wool dress goods. At present they have two looms, but expect to soon add more.

Enlargements and Improvements.

—California, Napa. The managers of the Napa Woolen Mill are putting in a new set of cards, which will give them a total of 5 sets. They operate about 22 looms.

—Iowa, West Point. The West Point Woolen Mfg. Co., which started a mill about March 1st, 1898, have now decided to put another story on one of their buildings. F Kreikenbaum is president.

—Kentucky, Mayfield. The Mayfield Woolen Mills have let contract for their addition to C. H. Chamblin. As recently mentioned, Hales & Ballinger, Philadelphia, are the architects. J. D. Simpson is secretary of the company. Three sets of cards, 26 broad looms, 30 narrow looms and 1292 spindles have been ordered, which will double the capacity.

—Maine, Lewiston. Thomas Kelly & Co. inform us that their improvements at the Columbia Mills consist of a new wheel house and two horizontal Victor water wheels and rope drives.

Mills Starting Up.

—Connecticut, Norwich. The Otrobando Woolen Co., organized in January to operate the Norwood Woolen Mills, have now 7 sets in operation and expect to soon have the entire plant running on men's ware and fancy woolens.

—Maine, Industry. The old woolen carding mill here will be operated by Ward Jordan and his uncle, J. T. Jordan. A new water wheel will be put in.

—Massachusetts, Blackstone. The Blackstone Woolen Co. is putting in some new machinery in its mill No. 1, and it is understood that the plant will be started by Sept. 1st.

—Indiana, New Albany. The New Albany Woolen Mills have started upon full time, having received a government contract for 95,000 yards of blouse linings.

Mills Shutting Down.

—Connecticut, Danielson. C. D. & C. S. Chace, proprietors, Elmville Mill, have closed the mill for an indefinite time. About 75 hands were employed.

—Maine, Kezar Falls. The Kezar Falls Woolen Co. are running their mill five days a week at present and it is thought that a further reduction in running schedule will soon be made. They have 3 sets of cards and 22 looms. Product is covert cloth.

—Maine, North Vassalboro. The North Vassalboro Woolen Co., employing 100 hands, has reduced its running time to 40 hours a week.

—Maine, Oldtown. The Oldtown Woolen Mill, which has been running on short time for some weeks, has now shut down indefinitely.

Knit.

New Mills.

—Indiana, Fort Wayne. O. H. Larwil, formerly treasurer of the Wayne Knitting Mills, is endeavoring to form a company to erect a knitting plant here to make high grade hosiery especially for children. This line will not conflict with the Wayne Knitting Mills, of which Mr. Larwil is a director.

—Minnesota, Duluth. Nielsen Bros., formerly of Northfield, Minn. have already started up their plant here, employing 25 hands on ladies' skirts, hosiery, men's cardigan jackets, sweaters and heavy all wool underwear. They have ten knitting machines.

—*New Jersey, Camden. The new cotton hosiery mill recently mentioned of the Holt Mfg. Co., Second and Erie Sts., will have 24 new knitting machines and make ladies' hose and men's half hose.

—Massachusetts, Lawrence. The Lawrence Knitting Co., in which John D. Dodge is interested, which has been located in Methuen for several years, will now be removed to the Rankin Building, on Oxford St., Lawrence.

—*Pennsylvania, Lykens. Fisher & Jones inform us that they expect to start their new hosiery mill June 13th, 1898. This is a new structure, 24x68, with 20 automatic knitting machines with steam power. They will employ 25 hands and make 176 needle cotton half hose. This is a new concern with a capital of $7,000 J. R. Fisher and Edward P. Jones are the partners.

—*Pennsylvania, Philadelphia. The Linton Hosiery Mills is the name of the new company just starting on 726 Girard Ave., and recently mentioned. R. M. Linton is proprietor, and cotton hosiery will be made.

—*Tennessee, Athens. The Tennessee Underwear Mill, of which W. Gettys was to be manager, will probably not be built for some months, owing to illness of Mr. Getteys. When start is made, the plant will cost about $15,000.

Enlargements and Improvements.

—Georgia, Marietta. The capital stock of the Marietta Knitting Co. has been increased to $18,000 from $7,500. The main building will be enlarged by a 35 ft. addition and new machinery will be put in including 14 knitting machines, new dryers and finishing machinery. When these enlargements are made, the mill will have a daily capacity of about 200 dozen hose. R. H. Bortheutt and J. H. Barnes are managers.

—*Georgia, Marietta. The Marietta Knitting Co., which recently increased its capital stock from $7500 to $18,000, have added 25 new knitting machines, employing 20 more hands. Their product is 175 needle, black half hose. The officers are as follows: president and treasurer, R. H. Northcutt; superintendent, J. H. Barnes; selling agent, J. D. Northcutt.

Mills Starting Up.

—*Connecticut, Rockville. The mill of Samuel Fitch & Sons Co. was started up in part recently with Wm. Grandage as superintendent, employing about 60 hands. The company has been reorganized. The officers are now P. S. Peckham, Jr., pres.; E. D. Brown, sec.; Jesse Eddy, treas. They manufacture knit goods and rubber linings.

—*Michigan, Muskegon. The Amazon Knitting Co., which was financially embarrassed about April 1, has now been reorganized under the name of the Amazon Knitting Co., with a capital of $100,000, and will be operated. The president is Charles H. Hackley; vice president, George W. Powell; secretary and treasurer, Thomas Hume. Messrs. Hume and Hackley hold the controlling interest.

Mills Shutting Down.

—Connecticut, Norfolk. The Norfolk & New Brunswick Hosiery Co. shut down its mill here for an indefinite period. Its mill at New Brunswick, N. J. is running in full.

—New York, Little Falls. The Knitting Mill, of which Charles King is proprietor, has been closed for an indefinite period. This throws about 200 hands out of work.

Silk.

New Mills.

—*Pennsylvania, South Bethlehem. The Duplan Silk Co., a branch of Duplan & Co., Lyons, France, has commenced setting up machinery in the building of the Lehigh Valley Silk Co., Seneca Vt., and it is expected that production will commence in July. This company was mentioned last February as incorporated. Capital stock, $100,000.

—*Pennsylvania, Wilkesbarre. It is announced that Bamford Bros. have decided upon this place as the location for a new silk mill, which will employ about 1,000 hands. The mill will be located on South Empire St. Building, 350x45, four stories, of brick. Bamford Bros. have been negotiating with several other Pennsylvania towns but it is now understood that their decision in favor of Wilkesbarre is final.

Enlargements and Improvements.

—New Jersey, Paterson. Cornforth & Marx, recently mentioned, inform us that they expect the production at their new mill will be started July 1, employing fifty hands, on broad silks, tie and dress silks, and specialties. They will have twenty new looms, which will give them a total of 150 looms. Steam power will be used. Their capital is $60,000. President, W. H. Cornforth; treasurer, Albert Marx.

—Pennsylvania, Catasauqua. The Wahneta Silk Mills have let contract for their addition to Franklin Goldsmith, of this place.

Miscellaneous.

New Mills.

—Massachusetts, Woonsocket. The Pycott Mfg. Co. is the name of a new corporation organized last month at Arlington, N. J., the purpose being to manufacture, dye, bleach, and finish all kinds of textile fabrics, etc., with or without the application of "pyralin." Capital is $1,000,000. Directors are Col. Peter H. Corr of the Corr Mfg. Co. and the Nemasket Mills of Taunton, Mass.; Col. Frank Harris, treas., Hamlet Mill, Woonsocket, R. I.; Edward Harris Rathbun of the Ray Woolen Co., Franklin, Mass.; Mr. Schultz, treas. Arlington Mfg. Co., 275 Broadway, New York City; Albert C. Hoy, secy. Rhode Island Granite & Pressed Brick Co., Woonsocket, R. I.; also A. Kitz of Bossut, Pere & Fils, New York. The officers are Peter H. Corr, pres.; Frank Harris, treas. and general manager; and Albert C. Hoy, secy. The The company owns the rights for the "pyralin" compound for North America, which will probably be manufactured and applied to cloth at Taunton.

Mills Starting Up.

—Massachusetts, Lee. O. F. Germaine has rented the Bostwick Shoddy Mill, at this place, for a term of five years, and will operate the plant.

—New York, Lockport. The cotton batting factory of E. W. Rogers' Sons, on Market St., which was damaged by fire last month, has been remodelled and is now running on full time.

Mills Shutting Down.

—New York, Garnerville. The Rockland Print Works shut down May 28th and it is feared that the plant will be closed for some time. There were over 1,000 operatives employed.

—New York, Wappinger's Falls. Several departments of the Dutchess Co.'s Print Works have been closed down, and it is feared that other departments may follow soon. The plant employs 1,000 hands and is owned by the Garner Estate.

Fires.

—Kentucky, Louisville. Fire in the rope factory of T. P. Patchell on Sixth and N Sts., May 24th, entirely destroyed the plant. Loss is estimated at about $3,000. Not insured.

—Maine, Gardiner. The mill of the Gardiner Woolen Co. was damaged by fire April 25th to an extent of $8,000. Fire damaged the main building, dry room, reel room, and picker house.

—Massachusetts, Lawrence. The mill on Holly St., owned by the heirs of John W. Barlow, was damaged by fire May 20th to the extent of about $5,000. This plant is well known as producing loom pickers and general mill supplies.

Facts and Gossip.

—Canada, Montreal. At the annual meeting of the Canadian Colored Cotton Co., held recently, David Morrice was elected president, succeeding A. F. Gault.

—*Connecticut, Mystic. About 30 looms are now in operation by the Rossie Velvet Co. and 20 more looms will be shipped from Germany at once.

—Connecticut, Rockville. The Rock Mfg. Co. and the American Mills Co., recently received large government orders which will keep the mills busy for four or five weeks. These goods are light blue woolens for the army.

—Connecticut, Rockville. The silk mills of Belding Bros. & Co. are rushed on orders for silk for the government.

Connecticut, Rockville. The Regan Mills, which have been operated by the estate of James J. Regan, will hereafter be operated by the James J. Regan Mfg. Co., which has been incorporated with a capital of $200,000. The stock is held as follows: Francis J. Regan, 400 shares; Herbert J. Regan, 400 shares; May J. Kehoe, 400; Isabella J. Hewes, 400; Sylvester J. Regan, by Francis J. Regan, conservator, 400 shares. Par value is $100.

—Connecticut, Montville. The Montville Woolen Mills, which have been running night and day, have now discontinued night work.

—Connecticut, Moodus. Carlos Barry has sold his cotton duck mill to Thos. Smith Duese, of Chester, and building will be hereafter used as a machine shop.

—Connecticut, Moosup. The Union Mill, of the Aldrich Mfg. Co., is now running

overtime to keep up with orders. A number of new looms have recently been put in.

—Connecticut, Winsted. The New England Knitting Co. are now running twelve hours a day, employing 150 hands, having a large number of orders on hand.

—Indiana, Fort Wayne. The Fort Wayne Knitting Co. has increased its capital stock from $125,000 to $200,000.

—Indiana, Indianapolis. The Model Woolen Co. is now running until 9 o'clock 5 days of the week and employs more people than it ever has done before.

—Maine, Bridgeton. The Pondicherry Co. will run night and day on government orders.

—Maine, Madison. The Madison Woolen Co., has a government contract, and is now running on full time.

—Maine, North Dexter. The Dews Woolen Co. is still running overtime. The company has plenty of orders on hand.

—Maine, Sanford. The Sanford Woolen Mills have restored wages, which were recently cut. This advance was made without any request on the part of the operatives. Orders have come in which will necessitate putting on a night force.

—Maine, Skowhegan. The Lewis Anderson Co. has been organized to operate the Coburn Woolen Mills. Capital, $100,000, all paid in. Pres., R. B. Sheppard of Skowhegan; treas., Lewis Anderson of Skowhegan.

—Massachusetts, Adams. The Berkshire Mfg. Co. has made a reduction of 10 per cent. in wages, which affects 2,000 operatives.

—Massachusetts, Chicopee Falls. The firm of Taylor, Bramley & Co. has now been incorporated, and will be known as the Taylor-Bramley Co. H. L. Mallory, pres.; A. E. Taylor, treas. Capital, $20,000. They manufacture knit goods.

PERSONAL RECORD.

Cotton.

—Geo. A. Wallace, recently in the spinning department of the Pepperell Mfg. Co., Biddeford, Me., is now at Vancluse, S. C.

Edwin Barlow has accepted the position as overseer of mule spinning with the Boston Mfg. Co., Waltham, Mass., made vacant by the death of Mr. Nugent.

—B. F. Hamilton, 43 years an employee of the Atlantic Cotton Mills, Lawrence, Mass., and for 11 years master mechanic with the company, has resigned.

—J. M. Stevens, boss weaver at the Pepperton Mills, Jackson, Ga., will accept a position at the Maginnis Mills, New Orleans, La.

—A. Johnson, of Halifax, has succeeded J. C. Mailloux, former overseer of weaving at the Nourse Mill of the Social Mfg. Co., Woonsocket, R. I. Mr. Mailloux is now overseer of weaving at the Social Mill of the above company.

—Thomas Pennington, on account of ill health, has given up his position as overseer of weaving of the Shove Mills, Fall River, Mass.

—Michael Mullaney, formerly of Mill No. 2 of the Acushnet Mill Corporation, New Bedford, has been employed as overseer of the mule-room at the Androscoggin Mills, Lewiston, Me.

—George Montgomery, formerly in the furnishing department of the Slatersville Mills, R. I., is now in a similar position in Pawtucket, R. I.

—Maj. Henry J. Thayer, book-keeper of the Monohansett Mfg. Co., Putman, Conn., is now secretary and treasurer.

—Frederick D. Ballou has been appointed assistant superintendent of the Utica Steam Cotton Mills, Utica, N. Y. He was formerly overseer of carding at the Rockdale Mill, Northbridge, Mass.

—Watt P. Kelley has resigned at the Ettrick Cotton Mills, Petersburg, Va., and is now employed as boss weaver at the Muscogee Mills of Columbus, Ga.

—Charles Kinnett has accepted his former position as overseer of weaving at the Paragon Mills, Columbus, Ga., having resigned a short time ago to go into the grocery business. Coarse colored goods are made at these mills.

—John Greer has been engaged as boss carder at the Alabama Cordage Works, Montgomery, Ala. He was formerly at the Blue Springs Cotton Mills, Oxford, Ala., in charge of the carding and spinning.

—William H. Harrison is now taking charge of weaving for the Aldrich Mill, Moosup, Conn.

—George Vickery, formerly superintendent of the Windsor Co., North Adams, Mass. is now at Uxbridge.

—C. D. Hatch, of Pittsfield, has succeeded A. P. Horne as overseer of weaving at the Amory Manufacturing Co., Manchester, N. H.

—Charles H. Smith, overseer of card room of the China Mill, Suncook, N. H., has removed to Massachusetts to accept a similar position in a large cotton mill.

—James E. Osborn, at the urgent request of the directors, has accepted the agency of the Merchants' Manufacturing Co., Fall River, Mass., Andrew Borden having resigned. Mr. Osborn will also retain the agency of the American Linen Co.

—S. M. Lougee, formerly superintendent of the Atlantic Mills, Olneyville, R. I. has retired from active business and will live in Harvard, Mass. He has been succeeded by Thomas Owen, who has been studying in European textile schools for a number of years.

—John Blount, of Woonsocket, R. I., is now machinist at the Slaterville, R. I. Mills.

—John Crossland, formerly foreman of carding at the Union Cotton Mills, Moosup, Conn., has resigned and removed to Northbridge, Mass., to take a similar position.

A. A. Milliken of the Lawrence Mfg. Co., Lowell, Mass., has accepted a position in the cloth room of the Hamilton Mfg. Co., Lowell. J. M. Foster, whom Mr. Milliken succeeded, is now overseer of the weaving department of the McGinnes Mills of New Orleans, La.

—George Chapman has resigned as foreman of the spinning department of the Lockwood Mills, Waterville, Me., to accept a much better position in a New Jersey mill.

—John H. Vernon has resigned as second hand of the Narragansett Mills to accept a position as overseer of weaving at the Shove Mills, Fall River.

Woolen.

Wm. C. Haberer, recently superintendent and designer at the Seneca Woolen Mills, Seneca Falls, N. Y., has accepted the superintendency of the Liberty Woolen Mills, recently started up, Bedford City, Virginia.

—Thomas Richmond, recently at Leominster, Mass., is now boss carder for the Summit Woolen Co., Stafford Springs, Conn, of which Thomas Rawley is secretary and assistant treasurer.

—Clarence J. Bodfish has severed his connections with the Camden, (N. J.) Woolen Mills to accept a better position as superintendent at Lawrence, Mass. His family will remain in Camden during this summer.

Several changes have occurred in the management of the Brown Mfg. Co.'s mills, Dover, Maine. R. W. Barber, superintendent for five years, has been succeeded by E. S. Robinson, who formerly held this position, until a new superintendent can be obtained. William Burdick has also severed connections with the mills and Andrew McSorley has succeeded him as boss carder.

—C. H. Blackburn has succeeded Ed. Saunders as spinning overseer at the Hillsboro Woolen Mill, Hillsboro, N. H.

—James V. Turner, recently of Hyannis, Mass., who was recently appointed superintendent of the Camden Woolen Co., Camden, Me., is giving much satisfaction in turning out orders for fine covert cloth suitings.

—Richard Graham has resigned as boss dyer at the Peru Woolen Mills, Peru Ind., where he had been employed for five years.

—W. S. Morrow, formerly at the Georges River Mills, Warren, Me., has resigned to accept a position as overseer of card room of the Penobscot Woolen Co., Dexter, Me.

—Frederick C. Werner is now superintending the Seneca Falls Woolen Mills, New York, having resigned as designer at the Blackinton Mills, Mass.

—Ernest W. Hogg, overseer of spinning and twisting departments at the S. Sanford & Son's Carpet Mills, Amsterdam, N. Y., was elected treasurer of the Amsterdam Volunteer Fire Department.

—George Geb, formerly overseer of carding at the Hampden Woolen Co., Dalton, Mass., is now with the Hawthorn Woolen Co., Glenville, Conn., as carding overseer.

—J. F. Morley, formerly overseer of finishing at the Dayville Woolen Co., Killingly, Conn., has acepted a position with George Whitney Woolen Co., Enfield, N. H.

—Charles Jennings has been employed as carder at the French River Textile Co., of Mechanicsville, Conn., having recently resigned his position with L. D. Perry, Webster, Mass.

—C. A. Keith, of Milford, Mass., has been employed as overseer of carding by Joseph Wilde & Co., Brooklyn, N. Y.

—William Blackwood is now designer for Thomas Dolan & Co., Philadelphia.

—Richard Greaves, formerly with George Mallison & Co., Chester, Pa., is now with James Roy & Co., of West Troy, N. Y. as indigo dyer.

—C. Frank Scott, formerly overseer of the picking department of the Merrimack Woolen Mills, Dracut, Mass., has resigned to accept a similar position with the Faulkner Mills, Lowell, Mass.

—W. J. Bleakie, of Hyde Park, Mass., has been appointed superintendent and designer of the two upper mills of the Bleakie Woolen Co., Sabattus, Me.

—E. W. Farris is now boss weaver at the Lincoln Mill, Lewiston, Me.

—C. S. Parker, of Uxbridge, Mass., has been employed by the Thomas Kay Woolen Mill Co., Salem, Ore., to take charge of their finishing room.

—George Shortwell has accepted a position as overseer of worsted dyeing at the Hockanum Co., Rockville, Conn. He was formerly engaged in this capacity at the Globe Woolen Co., Utica, N. Y.

—William G. Knowles, Jr. is now superintendent of the beaming and finishing departments of the Knowles Woolen Mills of New Castle, Del.

—Firth B. Rollinson has resigned as manager of Glen Tay Woolen Mills, Ontario, and is now superintendent of the Paton Mfg. Co., Sherbrooke, Quebec. Upon his leaving the woolen mills he was presented with a beautiful gold-headed cane by the employees.

—D. P. Warwick has accepted a position as designer at the Newport Woolen Mill, Newport, Me. He was recently with the Paton Mfg. Co., Sherbrooke, Canada.

—Alfred Say is now engaged as loom fixer in the Hockanum Mill, Rockville, Conn. Lieutenant J. Paul Haun, the former loom fixer, has gone to camp.

—Walter Oliver is now assistant superintendent in the Mississippi Mills, Wesson, Miss. He was formerly with Adam Lomas & Son, Sherbrooke, P. Q.

—Ernest Ladewig has been engaged as agent for the Granite Mills, St. Hyacinthe, P. Q. He has been head designer at the Manchester Mills, Manchester, N. H., for the past two years, and is a man of great ability.

—T. E. Priest has accepted a position with the Pioneer Mill, Pittsfield, Me., having resigned as loom fixer at North Vassalboro, Me.

—Frank L. Sarr, formerly at Marcellus, N. Y., and Plymouth, Mass., has succeeded Andrew McSorley as carder at Newport Mill, Newport, Me.; Fred Pushaw being his second hand.

—William M. Edwards is now in charge of the wet finishing for the Franklin Mills, Franklin Falls, N. H.

—George G. Smith, Warehouse Point, Conn., is now employed at the Broad Brook Woolen Co., Conn.

Knit.

—A. B. Moffett, formerly manager of the Mankato Knitting Mill, has resigned to accept position as manager with Cooper, Wells & Co., large hosiery manufacturers of St Joseph, Mich.

—Walter P. Quinlan, since the 15th of April has been manager of the Keystone Underwear Co., Lititz, Pa. Recently he has been in business for himself, and previous to that was manager for John E. Hanifen, located at Philadelphia, Pa.

—Frank Purdy, of Cohoes, N. Y., has moved to Capron, N. Y., where he will be employed as overseer of the press and finishing rooms of the Capron Knitting Co. Henry McDermott, Harry Sault, and two other young men of Cohoes accompanied him and will also be engaged at the mill. Charles Woolford is superintendent of the Capron Knitting Co.

—E. P. Bythrow, overseer in the hosiery mill at Hooksett, N. H., has resigned and removed to Lowell, Mass.

—A. Horsfall, of Laconia, N. H., has accepted a position as boss dyer with the Middlesex Knitting Co., Martinsburg, W. Va.

—John Donahue has severed his connection with the Clover Knitting Co., Waterford, N. Y., and Augustus Longley, of Cohoes, has been appointed superintendent in siphlN.....l.oR.....adery6 ilte ent in his place and John C. Calhoun has been appointed overseer of carding.

—H. J. Spilman has recently been appointed superintendent and general manager of a new mill at Lancaster, Pa., recently started by Stehli & Co., of Zurich, Switzerland, resigning from his position at the silk mills of Hess, Goldsmith & Co., Wilkesbarre, Pa., where he has been superintendent for 10 years.

Miscellaneous.

—Charles B. Cook has been elected president and one of the directors of the Algonquin Printing Co., Fall River, Mass., to fill the vacancies caused by the death of Mr. Stevens.

Deaths.

Abraham Mills, son of the late Professor Abraham Mills, died very suddenly at his home on 116 East Twenty-ninth St., New York, on Monday, May 16th. He has been identified with the wool trade for a number of years and was held in high esteem. He was a member of the Union, Down Town Association, Union League, the Wool and Riding clubs. A widow and two daughters survive him.

—Edward Sumner Page, one of the oldest mill overseers in Willimantic, Conn., died at his home in that city April 20. Soon after the organization of the Willimantic Linen Co., he was appointed carding overseer, and until his death held the same position. He leaves a widow and two children.

—Joseph R. James, superintendent and treasurer of the Southwark Mills Co., of Philadelphia, Pa., died on May 11th, his death being caused by paralysis of the brain. Mr. James was held in high esteem by the wool trade, with which he was associated so many years. A widow and two sons survive him.

—David W. Chandler, supt. of the Bound Brook, (N. J.) Woolen Mills, died last month, aged 57 years. Mr. Chandler served in the civil war and since then and up to 1885, when he was appointed superintendent of the Bound Brook Mills, he had seen associated with wool manufacturing in Massachusetts and Rhode Island.

—Irenaeus H. Low died Saturday, May 7th, at his home on Forest St., Whitinsville, Mass., from heart failure. He had been employed by the late John C. Whitin before the plant had been removed from Holyoke and came to Whitinsville with it. He was foreman of the carding and loom work for a number of years.

—Julius Ottenheimer died April 29th at his home on 59 East 66th St., New York. Mr. Ottenheimer has been head of the firm of J. Ottenheimer & Co., manufacturers of underwear, until very recently, when, through ill health, he became a special partner, and the firm name was changed to Heller & Kaufmann. He leaves a widow and two daughters.

—William R. Mills, of Rockville, Conn., died May 13th from apoplexy. He was associted with the old Florence mills for some time and was also in the employ of the Fitch Millls. He was a member of Fayette Masonic Lodge, Adoniram Chapter and Council, and past master of Fayette Lodge and past high priest of Adoniram Chapter. A wife and one son survive him.

—Thomas Dalby, one of the best-known manufacturers in this country, passed away in Chicago April 4. He was returning from a trip to California, where he passed his winters owing to ill health. Mr. Dalby was born in Leicester, England, in 1823, and came to this country when a young man and settled in Watertown ,and built a small factory on the Newton side of the Charles River at Etna Mills, where he conducted a knitting business. In a short time he erected extensive factories on Chapel St., Nonantum, where he was engaged in business for about 20 years, when he sold out for $150,000. In 1880 he went into business on Morse St., Watertown, which business developed into a great success.

—Charles W. Hackett died recently in Florida, age 44 years. He started when a lad as office boy for the Utica & Black R. R. Co., soon after being promoted to the position of bookkeeper and then to general freight agent of the company. At the time of his death he was a partner in a successful knitting mill company with a factory near Utica. Mr.

Hackett was also connected with the firm of Hackett & Atwood and Richard Marcy & Co., coal dealers. He was one of the principal owners of the The Utica Herald and was also a director of the Franklin National Bank and New York Casualty Insurance Co., both of New York City. Two children survive him.

—The Hon. Jeremiah Clark, the well known textile machinery dealer of Lowell, Mass., died April 22nd, at the age of 79 years. Many friends will mourn his loss.

—Joseph Murdock, president of the American Card Clothing Co., Worcester, Mass., died recently at his home on Main St., Leicester. When Mr. Murdock was 18 years of age, he started a mercantile business in Macon, Ga., which he conducted until 1847, when he entered the carding clothing business in company with his brother, Joshua, under the firm name of J. & J. Murdock. His only son, Julius O. survives him.

—Col. John M. Sandige died recently at his residence in Bastrop, La., in his eighty-first year. After having served in the war, Mr. Sandige established the commission and cotton factorage firm of Spyker & Sandige at New Orleans, which firm name, after the death of the senior member, was changed to that of John M. Sandige & Co., which continued to do a large cotton business.

—Louis Sharrow, second hand in the dye house of the Windsor Print Works, North Adams, Mass., met with a terrible death, April 5th. Sharrow ascended a 16-foot ladder to slip a belt upon a pulley and while reaching over a shaft, which was runnig at the rate of 130 revolutions per minute, which was at right angles with the one upon which the belt was to be adjusted, his jacket, flying loose, was entangled in it, and he was whirled about the shaft until the machinery could be stopped, with each revolution his body striking an overhead beam. His back, arms and legs were broken.

—Warren A. Upton passed away at his residence in North Salem recently, in his sixty-sixth year. He was a machinist in the Naumkeag Cotton Mills for a number of years.

—Charles N. Harder passed away very suddenly at his home at Philmont, N. Y., March 21st, in his forty-fourth year, his death being caused from apoplexy. Mr. Harder was one of the largest stockholders of the High Rock Knitting Co. and one of the most prominent business men in the country. He was the son of Phillip Michael Harder, a pioneer in the knit goods business at Philmont, and was a brother of William A. Harder, Jr., the head of the Harder Knitting Co. of Hudson.

—Joseph H. Libby, carding overseer at the York Mills, Saco, Me., and one of the oldest employes of that firm, died from pneumonia very suddenly on March 28th, at the age of 61 years.

—James A. Needham, of Waltham, Mass., died recently, aged 55 years. Mr. Needham commenced work at the Lancaster Mills, Clinton, at age of 15 and when his father died in 1878, who was carding overseer at the mills, he succeeded him. About five years ago, he resigned and engaged in the manufacture of absorbent cotton.

—Patrick A. Nugent, formerly foreman of spinning at the Boston Mfg. Co., Waltham, Mass., died at his home on 169 Charles St., April 27th, age 45, after a short illness. A wife and four children survive him.

—Andrew R. Henderson, of Fort Wayne, Ind., died May 15th at his home on 115 East Wayne St., age 72 years. Mr. Henderson, at the age of 30, secured a position at the Fort Wayne Woolen Mills and was soon promoted to superintendent of the mills, which position he held until the mills were shut down, when he retired from business.

—George Jackson died recently at his home on 153 Bridge Ave., Adams' Island, Cohoes, N. Y., age 72. Mr. Jackson was born in the North of Ireland and come to America in 1842 and was employed at the Egbert Knitting Mill, Cohoes, N. Y. For some time he was engaged at different mills as overseer of knitting, being at the Root Mfg. Co. as overseer for a number of years, when he resigned and erected a mill on Adams Island, which he operated for a short time, when the mill, which is located near the west approach of the island bridge passed into other hands, and is now the property of Swatling & Tanner.

—Thomas H. Clark, of Valley Falls, R. I., died recently at his home, 81 years old. Some time ago he was superintendent of Governor Jackson's mill at Jackson and Fiskville, was agent for a Fitchburg mill, had also worked at the Sprague Mill in Central Falls, and recently had been in the employ of the Albion Co. of Valley Falls, R. I.

—W. P. Uhlinger, the first Jacquard machine and ribbon loom manufacturer of this country, died recently in San Diego, Cal., 75 ages of age. Mr. Ulinger was rn in Switzerland and came to Philadelborn in Switzerland and came to Philadelphia, Pa., when he was 25 years old and secured a position as head machinist. While working in Philadelphia, he built several fringe and trimming looms and also Jacquard machines. After two years he resigned as head machinist, and commenced constructing the first iron Jacquard machine and fringe and ribbon looms made in this country. During the war he manufactured a great variety of war implements. About nine years ago Mr. Uhlinger retired, and has been travelling to quite an extent.

—George A. Clay, paymaster of the Boston Mfg. Co., of Waltham, Mass., died May 7th at the Waltham Hospital, aged 33 years. Mr. Clay held his position at the Boston Mfg. Co., for nine years and previously was paymaster at the Lawrence Mfg. Co., of Lowell, Mass.

—Augustus F. Lamb, secretary and treasurer of the Monohansett Mfg. Co., of Putnam, Conn., died at his home on Angell St., Providence, April 18th, age 55 years. His widow and one child survive him.

—William F. Hatton, one of the best known textile machinery men in this country, died April 2nd, at his home in New Bedford. He came from England 12 years ago as fitter in the service of John Hetherington & Sons, cotton machinery manufacturers of Manchester, England, and was the first man to set up Hetherington machinery in New Bedford. He was employed by the Hetherington firm for 25 years.

—D. Reese Esrey, president of the firm of Shaw, Esrey & Co., Ltd., Chester, Pa. died April 11th at his home on Edgemont Ave., Chester, in his seventy-third year.

BUYERS' INDEX

Advertisers whose names do not appear under desired headings will please notify the publishers. Such omissions are accidental, not intentional.

Alphabetical Index to Advertisements follows this Classified List.

Architects and Mill Engineers.

Berlin Iron Bridge Co, The, East Berlin, Ct.
Ferguson, John W, Paterson, N. J.

Automatic Boiler Feeds.

D'Este & Seeley Co, 29 Haverhill St, Boston,

Automatic Feeds for Cotton and Wool.

Harwood, Geo. S, & Son, 53 State St, Boston.
Woonsocket Machine & Press Co, Woonsocket, R. I.

Balling Machine.

Torrance Mfg. Co, 18 Davis St, E. Newark, N. J.

Bandings.

See under Yarns.

Belting.

Alexander Bros., 410 No. 3d St., Phila., Pa.
Billington, J. H. & Co., 113 Chestnut St., Philadelphia.
Boston Belting Co., 256 Devonshire St., Boston, Mass.
Fell, Geo. & Son, Bolton, England.
Link Belt Machinery Co., Chicago, Ill.
Ulmer Leather Co, Norwich, Conn.
See also Mill Supplies.

Belt Dressing.

Alexander Bros, 410 No. 3d St, Phila, Pa.

Bindings.

See Tapes and Braids.

Bleaching Materials.

Roessler & Hasslacher Chemical Co, 100 William St, New York.

Boiler Compounds.

Carr Manufacturing Co., 69 Beverly St, Boston.
Imperial Chemical Co, 324 American St, Phila, Pa.

Boxes, Cloth Boards, Etc.

Pearson, J. T, Kensington, Pa.

Braids.

See Tapes, Braids and Edgings.

Burr Pickers.

Curtis & Marble Machine Co., Worcester, Mass.
Sargent's, C. G., Sons, Graniteville, Mass.

Card Clothing.

Ashworth, Elijah, Fall River, Mass.
Leigh, Evan A, 35 Mason Building, Boston.

Calico Printers' Machinery and Supplies.

Butterworth, H. W., Sons & Co., Philadelphia.
New Bedford Copper Co, New Bedford, Mass.
Phillips Co, The Thomas, Providence, R. I.
See also Dyeing, Bleaching Machinery, etc.

Carders' Tools.

Brown, W. H, Mechanic St, Worcester, Mass.

Carpet Machinery.

Altemus, W. W, & Son, 2816 N. 4th St, Phila, Pa.
Crompton & Knowles Loom Works, Worcester, Mass.
Curtis & Marble Machine Co, Worcester, Ms.
Furbush, M. A, & Son, Machine Co, Phila, Pa.
Howard, Geo. C., 1783 Barker St., Phila., Pa.

Chemicals and Apparatus.

Bullock & Crenshaw, 528 Arch St, Phila, Pa.
Roessler & Hasslacher Chemical Co, 100 William St, New York.

Chemist.

Adriance, John S., 105 East 39th St., New York.

Cloth Boards.

Flanders, E. A., North Dexter, Me.

Cloth Testing Machine.

McKnight, S, 771 Broadway, New York.

Clutches.

Eastern Machinery Co, The, New Haven, Conn.

Combs (Wool and Cotton).

Crabb, William, & Co, Newark, N. J.
Townsend, Thomas, 157 Orange St., Providence, R. I.

Comber Needles.

Townsend, Thos., Providence, R. I.

Commission Merchants.

Hayes, O. H, & Co, New York.

Copper Print Rollers.

New Bedford Copper Co, New Bedford, Mass.
Phillips Co, The Thomas, Providence, R. I.
Revere Copper Co, 174 Oliver St, Boston.

Copper Work for Dyers.

Phillips Co, The Thomas, Providence, R. I.

Cotton (Egyptian).

Stoddard, Haserick, Richards & Co., Boston.

Cotton Machinery.

Altemus, W. W, & Son, 2816 N. 4th St, Phila. Pa.
Ashworth, Elijah, Fall River, Mass.
Cobb, Thad. S., Machinery Co., Lowell,
Crompton & Knowles Loom Works, Worcester, Mass.
Curtis & Marble Machine Co, Worcester, Mass.
Draper Company, Hopedale, Mass.
Fairmount Machine Co, 22d and Wood Sts, Philadelphia.
Howard & Bullough American Machine Co, Pawtucket, R. I.
Kilburn, Lincoln & Co, Fall River, Mass.
Leigh, Evan A, 35 Mason Building, Boston.
Lowell Machine Shop, Lowell, Mass.
Mason Machine Works, Taunton, Mass.
Payne, Geo. W, & Co, Pawtucket, R. I.
Phillips Co, The Thomas, Providence, R. I.
Stoddard, Haserick, Richards & Co, Boston, Mass.
Townsend, Thomas, 157 Orange St., Providence, R. I.
Whitin Machine Wks, Whitinsville, Mass.
Woonsocket Machine & Press Co, Woonsocket, R, I.

Cotton Openers and Lappers.

Howard & Bullough American Machine Co, Pawtucket, R. I.

Cutters for Knit Fabrics.

Kennedy, Thos. (Cutters, etc.,) Cohoes, N. Y.

Damper Regulators.

D'Este & Seeley Co. (Curtis), 29 Haverhil St, Boston, Mass.

Designers.

Fresnel, Gustave, 125 W. 56th St, N. Y.

Dryers.

Philadelphia Textile Machinery Co, Philadelphia, Pa.
Phillips Co, The Thomas, Providence, R. I.
Sargent's, C. G., Sons, Graniteville, Mass.
Sturtevant, B. F. Co, 34 Oliver St, Boston, Mass.

Dusters.

See Wool and Waste Dusters.

Dyeing, Bleaching and Finishing.

Brophy's, T, Sons, Jasper St, Philadelphia.
Greenwood, R. & Banlt, Frankford, Pa.
Home Bleach & Dye Works, Pawtucket and Valley Falls, R. I.
Littlewood, G. J., & Sons, Manayunk, Pa.
Warren, W, Thread Works, Westfield, Mass.
Webster Dye Works, Webster, Mass.

Dyeing, Drying, Bleaching and Finishing Machinery.

Butterworth, H. W, & Sons Co, Phila, Pa.
Curtis & Marble Machine Co, Worcester, Mass.
Fairmount Machine Co, 22 and Wood Sts, Philadelphia.
Granger Foundry & Machine Co, Providence, R. I.
Hopkins, A, & Co, Bridgeton, R. I.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Lincoln, The, Co, 54 Arch St, Hartford, Ct.
Phenix Iron Foundry, Providence, R. I.
Phillips, The Thomas Co, 91-95 South Main St, Providence, R. I.
Sturtevant, B. F. Co, 34 Oliver St, Boston, Mass. (Drying.)
Woonsocket Machine & Press Co, Woonsocket, R. I.
Woonsocket Napping Machine Co, Woonsocket, R. I.

Dye Sticks.

Haedrich, E. M, 311 1-2 Walnut St, Phila, Pa.

Dyestuffs and Chemicals.

Amend Process Co., 205-211 Third Ave., New York.
Anchor Color Mfg. Co, 464 Cherry St, New York.
Bischoff, & Co, 87 Park Place, N. Y.
Bosson & Lane, 36 Central Wharf, Boston.
Cochrane Chemical Co., 50 Kilby St., Boston.
Corey, S. J, 273 Congress St, Boston.
Dillon & Co, 20 Cedar St, New York.
Farbenfabriken of Elberfeld Co, 40 Stone St, N. Y.
Geisenheimer & Co, 189 Front St, New York.
Hanna-Schoellkopf Co, Philadelphia, Pa.
Holliday, Read, & Sons, 100 William St., New York.
Innis & Co, 3 Cedar St, New York.
Jaeck Bros., The Co., 62-68 No. 11th St, Brooklyn, N. Y.
Janney, O. S, & Co, Phila. and Boston.
Johnson, Chas. A, & Co, 22 Dey St, N. Y.
Johnson, Wm. G, & Co, Uncasville, Conn.
Keller, John J, & Co, 104-106 Murray St, N. Y.
Klipstein, A, & Co, 122 Pearl St, N. Y.
Koechl, Victor, & Co, 122 Hudson St, N. Y.
Matheson, W. J, & Co, 182-184 Front St, N. Y.
Merrimac Chemical Co, Boston, Mass.
N. Y. & Boston Dyewood Co, 55 Beekman St, New York.
Oakes Mfg. Co, 93 Pearl St, N. Y.
Phillips (Moro) Chemical Co, 131 S. 3d St, Phila., Pa.
Pickhardt & Kuttroff, New York.
Roessler & Hasslacher Chemical Co, 100 William St , New York.
Sharpless Dye Wood Ext. Co, 22 N. Front St, Phila, Pa.
Stamford Mfg. Co, 133-137 Front St., N. Y.
Stone & Ware Co, The, 157 Maiden Lane. N. Y.
Sykes & Street, 85 Water St, N. Y.
Thomas, N. Spencer, Elmira, New York.
Webster Dye Works, Webster, Mass.

Dyers and Finishers.

Boston Finishing Works, Williamstown Mass.
Cranston Worsted Mills (yarns), Bristol R. I.
Firth & Foster Co, Kensington, Pa.
Greenwood, R, & Banlt, Frankford, Pa.
Home Bleach & Dye Works, Pawtucket, R. I.
Oakdale Dye Works, 913 W. York St, Phila, Pa.
Pawtucket Dyeing & Bleaching Co, Pawtucket, R. I.
Warren, W, Thread Works, Westfield, Mass.
Webster Dye Works, Webster, Mass.

Dyers' Clogs.

Wildman, Jos, & Co, 1908 N. Front St, Phila.

Edgings.

See Tapes, Braids and Edgings.

Electrotyping and Printing.

Whitcomb, H. C, & Co, Boston.

Elevators.

Cohoes Foundry & Machine Co, Cohoes, N.Y.
Howard, Geo. C., 1783 Barker St., Phila., Pa.

Engineers, Mechanical.

Berlin Iron Bridge Co, E. Berlin, Ct.
Ferguson, John W, Paterson, N. J.

Express Money Orders and Travelers' Cheques.

American Express Co. offices in every city

Fans—Exhaust and Ventilating.

See Ventilating Apparatus.

Feeders

See Card Feeds.

Feed Water Pumps.

Goulds Mfg. Co, Seneca Falls, N. Y.
Phœnix Iron Foundry, Providence, R. I.

Finishing Machinery.

See Dyeing, Drying, Bleaching and Finishing.

Fluted Rolls.

Cohoes Foundry & Machine Co, Cohoes, N.Y
Thurston, A. G, & Son, Box 528, Fall River. Mass.

Fulling Mills for Woolen Goods.

Hopkins, A, & Co. Bridgeton, R. I.
Hunt, Rodney, Machine Co, Orange, Mass.
Hunter Jas, Machine Co, No. Adams, Mass.

Gas Engines.

Jones, Lewis, 60½ and Media Sts, Phila, Pa.

Gas Singeing Machines.

Butterworth, H. W, Sons Co., Philadelphia.
Curtis & Marble Machine Co, Worcester, Ms.

Gear Cutting Machine.

Blaisdell, P, & Co, Worcester, Mass.
Whiton, The D. E, Co, New London, Conn.

Harness Varnish.

D. L. Witmer & Bro, 5th St. and Germantown Ave, Philadelphia.

Heating.

See Ventilating.

Heddles.

Watson, L. S, Mfg. Co, Leicester, Mass.

Hosiery Boards.

Pearson, J. T, Kensington, Pa.

Hose and Rubber Goods.

Boston Belting Co., 256 Devonshire St., Boston.

Ink, Stamping.

Witmer, D. L, & Bro, 5th St. and Germantown Ave, Philadelphia.

Insurance (Employers' Liability).

Employers' Liability Assurance Co, 28 Central St, Boston, Mass.

Knit Goods Edgings, Trimmings, etc.

Cheney Bros, Silk Goods, 479 Broome St, N. Y.
Fleming & Chapin, 229-231 Church St, Phila, Pa.
Friedberger & Co, Edgings, Germantown Phila, Pa.
Hepner & Horwitz, Lacings, 30 Howard St, N. Y.
Krout & Fite Mfg. Co, 2632 Mascher St, Phila.
Weimar Bros, 1817 East York St, Phila. Pa.

Knit Goods Finishing Machines, Crochet, Etc.

Excelsior Sewing Machine Co, 120 N. 7th St, Phila, Pa.
Merrow Machine Co, The, Hartford, Conn.
Nye & Tredick, 606 Arch St, Phila, Pa.
Scott & Williams, 2097 E. Cumberland St, Phila, Pa.

Knit Goods Brushers.

Ardrey, S. B, & Sons, Bristol, Pa
Jones, Lewis, Philadelphia, Pa.
Musgrove, C. M., Plainville, Conn.

Knitting Machine Cylinders.
Paxton & O'Neill, 129 Bread St, Phila, Pa.
Stafford & Holt, Little Falls, N. Y.

Knitting Machinery.
Boss Knitting Machine Works, Elm and Reed Sts., Reading, Pa.
Branson Machine Co., 506 John St., Philadelphia.
Brinton, H, & Co, 213 Race St, Phila, Pa.
Campbell & Clute, Cohoes, N. Y.
Cooper, Chas, Bennington, Vt.
Crane Mfg. Co, Lakeport, N. H.
Excelsior Knitting Machine Manufacturing Co., Allentown, Pa.
Hepworth & Co, Lehigh Ave. and Mascher St, Phila, Pa.
Jenckes, E. Mfg. Co, Pawtucket, R. I.
Jones, Lewis, 60 1-2 and Media Sts, Philadelphia, Pa.
Kennedy, Thos. (Cutters, etc.), Cohoes, N. Y.
Keystone Knitting Machine Mfg. Co, 40 No. 7th St, Philadelphia, Pa.
Lamb Mfg. Co., Chicopee Falls, Mass.
Leighton Machine Co, Manchester, N. H.
Little Hustler Napper Co., Hudson, N. Y.
Mayo Knitting Machine & Needle Co, Franklin, N. H.
McMichael & Wildman Mfg. Co, Norristown, Pa.
Mueller, A, 760 Lexington Ave, Brooklyn, N. Y.
Nye & Tredick, 606 Arch St, Phila, Pa.
Paxton & O'Neill, 127 Bread St, Phila, Pa.
Payne, G. W. & Co, Pawtucket, R. I. (Winders.)
Pepper Mfg. Co, Lakeport, N. H.
Scott & Williams, 2097 E. Cumberland St., Phila., Pa.
Stafford & Holt, Little Falls, N. Y.
Standard Machine Co., 508 Minor St., Philadelphia, Pa.
Taylor, James, 835 Arch St, Phila, Pa.

Knitting Needles and Supplies.
Breedon, Wm, & Son, Amsterdam, N. Y.
Cooper, Chas, Bennington, Vt.
Corey, Wm, Co, Manchester, N. H.
Crane Mfg. Co , Lakeport, N. H.
Dodge Needle Co., Manchester, N. H.
Goldstein, J. 416 Arch St., Philadelphia.
Ives, Loyal T, New Brunswick, N. J.
Keystone Knitting Machine Mfg. Co, 40 No. 7th St, Philadelphia, Pa.
Lydall, H, & Foulds, Manchester, Conn.
Manufacturers' Supplies Co., 66 No. 4th St., Philadelphia.
Mayo Knitting Machine & Needle Co, Franklin, N. H.
Page Needle Co, Chicopee Falls, Mass.
Treat, Orion, Manchester Green, Conn.
Wardwell Needle Co, Lakeport, N. H.

Laboratory Outfits.
Bullock & Crenshaw, 528 Arch St Phila, Pa.

Lamps, Electric.
Beacon Lamp Co, New Brunswick, N. J.
Lynn Incandescent Lamp Co., Lynn, Mass.

Looms.
Crompton & Knowles Loom Works, Worcester, Mass.
Draper Company, Hopedale, Mass.
Fairmount Machine Works, 22d and Wood Sts. Philadelphia.
Furbush, M. A, & Son Co, Phila, Pa.
Howard, Geo. C., 1783 Barker St , Phila Pa. (For wire.)
Kilburn, Lincoln & Co, Fall River, Mass.
Lowell Machine Shop, Lowell, Mass.
Mason Machine Works, Taunton, Mass.
Whitin Machine Works, Whitinsville, Ms,
Woonsocket Machine & Press Co, Woonsocket, R. I.

Loom Picker Manufacturers.
Crompton & Knowles Loom Works, Worcester, Mass.
Loom Picker Co, Biddeford, Me.

Lubricators.
Dixon, Jos, Crucible Co, Jersey City, N. J.

Lumber.
Stearns, A. T, Lumber Co, Neponset, Mass.

Lumpers.
Gerry, George, & Son, Athol, Mass.

Machinery Dealers.
Jefferson, Ed, & Bro, 28 Strawberry St, Phila, Pa.

Machinery Wipers.
American Silk Mfg. Co, 311 Walnut St Philadelphia, Pa.
Wilkinson, Seth, Pawtucket, R. I.

Machinists' Tools.
Blaisdell, P, & Co, Worcester, Mass.
Whiton, The D. E. Co, New London, Conn.

Mails.
Walder, J, Paterson, N. J.

Measuring and Folding Machines.
Curtis & Marble Machine Co, Worcester, Ms.
Elliott & Hall, 544 Hermon St, Worcester, Mass.

Mills For Sale.
Denny, R. B., 143 Federal St., Boston.

Mill Builders and Engineers.
Berlin Iron Bridge Co, The, East Berlin, Ct.
Ferguson, John W, Paterson, N. J.

Mill Supplies.
American Supply Co, Providence, R. I.
Bamford & Smith, Pascoag, R. I.
Bristol, The, Co., Waterbury, Conn
Buckley's, Benj. Son, Gun Mill, Paterson, N. J.
Douglas Manufacturing Co., Fall River, Mass.
Harwood, Geo. S, & Son, 53 State St, Boston.
Hill, Jas, Mfg. Co. Providence, R. I.
Jefferson, Ed, & Bro, 28 Strawberry St, Phila, Pa.
Spofford, Wm. S, & Son, 5-11 Culver St, Providence, R. I.
Stevenson Bros. & Co, 132 So. 2d St, Philadelphia, Pa.
Thurston, A. G, & Son, Fall River, Mass.
Watson, L. S, Mfg. Co, Leicester, Mass.

Napping Machines.
American Napping Machine Co, Williamstown, Mass
Ardrey, S. B, & Sons, Bristol, Pa.
Curtis & Marble Machine Co, Worcester, Mass.
Jones, Lewis, 60 1-2 and Media Sts., Philadelphia, Pa.
Little Hustler Napping Co, Hudson, N. Y.
Woonsocket Napping Machine Co, Woonsocket, R. I.

Novelties.
Stohn, C, 178 Green St, Jamaica Plain, Mass.

Oilless Bearings.
N. American Metalline Co, 62 W. Ave. and 3rd St, Long Island City, N. Y.

Oil Filters.
Burt Mfg. Co, Akron, Ohio.
Robertson, Jas. L, & Sons, 204 Fulton St, New York.

Pantagraphs for Mill Engraving.
Johnson, C. A, & Co, 22 Dey St, New York.

Patent Solicitors.
Crosby & Gregory, 34 School St. Boston, Mass.
Massink, H., Amsterdam, Holland.
Phillips & Anderson, 53 State St, Boston.
Wright, Brown & Quinby, 53 State St, Boston, Mass.

Penstocks.
Dalrymple, George, Fair Haven, Vt.

Perforated Copper
Beckley, A. J. & Co., Garwood, N. J.

Peroxide of Sodium.
Roessler & Hasslacher Chemical Co., 100 William St, New York.

Picker Sticks.
Loom Picker Co., Biddeford, Me.
Smith, Lee, & Co., Knoxville, Tenn.

Picking, Carbonizing and Garnetting.
Garfield Woolen Co, Garfield, N. J.

Kennebec Woolen Mills 2025 Naudain St., Philadelphia.

Pipe Covering (Magnesia).

Keasby, R. A, 54 Warren St, New York.
Keasby & Mattison Co, Ambler, Pa.
Nightingale, S. C, & Childs, Atlantic Ave, Boston, Mass.

Pneumatic Conveying.

See Ventilating.

Power Transmitting Machinery.

Channon, H, Co, 25 Market St, Chicago, Ill.
Fairmount Machine Works, 22d and Wood Sts, Philadelphia.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Hunter, Jas, Machine Co, No. Adams, Mass.
Kilburn, Lincoln & Co, Fall River, Mass.
Link Belt Machinery Co, Chicago, Ill.

Presses.

Crawford, J. J, & Son, Nashua, N. H. (Power Screw, Hydraulic, Hollow Steam Plate.)
Curtis & Marble Machine Co, Worcester, Ms.
Hart, Charles, Frankford, Philadelphia.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Phillips Co, The Thomas, Providence, R. I
Pownall, F. H, Iron Works, Jamesburg, N. J.
Sullivan Machinery Co., Claremont, N. H.
Woonsocket Machine & Press Co, Woonsocket, R. I.

Pressure Regulators for Steam and Water.

D'Este & Seeley Co. (Curtis) 29 Haverhill St, Boston, Mass.

Printers and Embossers.

Novelty Textile Printing Co, 447-449 W. 14th St, New York.

Pumps.

Goulds Mfg. Co, Seneca Falls, N. Y.

Reed and Harness Manufacturers.

American Supply Co, Providence, R. I.
Loom Picker Co, Biddeford, Me.
Walder, J, Paterson, N. J.

Ribbons.

Cheney Bros, S. Manchester, Ct.

Roller Skins.

Fell, Geo, & Son, Bolton, England.

Roofing, Gravel, Slag and Composition.

Armitage Mfg. Co, Richmond, Va.
Johns, H. W., Mfg. Co., 100 William St. New York.
Warren Chemical & Mfg. Co, 45 Fulton St, New York.

Roofing, Paint and Paper.

Armitage Mfg. Co, Richmond, Va.

Roving Cans and Sheet Metal Work for Mills.

Hill, Jas, Mfg. Co, Providence, R. I.
Laminar, Fibre Co., No. Cambridge, Mass.
N. E. Ventilating & Heating Co, 980 Manton Ave. Providence, R. I.
Sullivan Machinery Co, Claremont, N. H.

Saddles, Stirrups and Levers.

Dixon Lubricating Saddle Co, Bristol, R. I.

Sample Cutters.

Gleason, A. H, Rockbottom, Mass.

Schools.

Gavey Correspondence School of Textile Design. P. O. Box 222, Brooklyn, N. Y.
Lowell Textile School, Lowell, Mass.
Philadelphia Textile School, Phila, Pa.

Sewing Machines and Supplies.

Curtis & Marble Machine Co, Worcester, Mass.
Frame, Gibbons, 2nd and Diamond Sts, Phila, Pa.
Manufacturers' Supplies Co., 66 No. 4th St., Philadelphia.
Nye & Tredick, 606 Arch St, Phila, Pa.
Scott & Williams, 6th and Arch Sts, Phila, Pa.

Shearing Machinery.

See Dyeing, Drying, Bleaching and Finishing.

Shell Rolls.

Cohoes Foundry & Mach. Co, Cohoes, N. Y.
Thurston, A. G, & Son, Box 528, Fall River, Mass.

Shoddies.

See Wool Shoddies.

Shuttles.

See Bobbins, Spools, Shuttles, Etc.

Silk Machinery.

Butterworth, H. W. Sons Co, Philadelphia.
Crompton & Knowles Loom Works, Worcester, Mass.

Singe Plates.

Butterworth, H. W. Sons Co., Philadelphia.
New Bedford Copper Co, New Bedford, Ms.

Sizing, Starch and Gums.

American Glutrose Works, Penn Mutual Bldg. Phila, Pa.
Stein, Hirsch & Co, 165 Duane St, New York.

Slashers.

Cohoes Foundry & Machine Co, Cohoes, N. Y.
Lowell Machine Shop, Lowell, Mass.
Phillips Co, The Thomas, Providence, R. I.

Soaps.

American Soap & Washolene Co, Cohoes, N. Y.
Holbrook Mfg. Co., 466 Washington St., N. Y.
India Alkali Works, Boston.

Spindles.

Buckley, Benj's, Sons, Gun Mill, Paterson, N. J.
Draper Company, Hopedale, Mass.
Ward & Vandegrift, Elmer, N. J.
Whitin Machine Wks, Whitinsville, Mass.

Spindle Tubes.

Bamford & Smith, Pascoag, R. I.

Spinning Cylinders.

Hill, Jas, Mfg. Co, Providence, R. I.
N. E. Ventilating & Heating Co, 980 Manton Ave, Providence, R. I.

Spinning Frames.

See Cotton Machinery.

Spinning Frames for Wool

Woonsocket Machine and Press Co., Woonsocket, R. I.

Spinning Rings.

Draper Company, Hopedale, Mass.
Whitinsville Spinning Ring Co, Whitinsville, Mass.

Spinners' Supplies.

Dixon Lubricating Saddle Co, Bristol, R. I.

Spinning Tubes.

Buckley, Benj's. Son, Gun Mill, Paterson, N. J.

Steam Boilers.

Brown, C. H, & Co, Fitchburg, Mass.

Steam Boiler Insurance.

Hartford Steam Boiler Inspection & Insurance Co, Hartford, Conn.
Mutual Boiler Insurance Co, 31 Milk St, Boston.

Steam Damper Regulators.

D'Este & Seeley Co, 29 Haverill St, Boston Mass.

Steam Engines.

Brown, C. H, & Co, Fitchburg, Mass.
Hooven (The), Owens & Reutschler Co, Hamilton, O.

Steam Separators.

D'Este & Seeley Co. (Curtis), 29 Haverill St., Boston.
Robertson, Jas. L, & Sons, 204 Fulton St, New York.

Steam Specialties.

Butterworth, H. W. Sons Co., Philadelphia.
D'Este & Seeley Co, 29 Haverhill St, Boston
Haines, W. S. C 136 South 4th St, Phila, Pa.
Robertson, Jas. L, & Sons, 204 Fulton St, New York.

Steam Traps.
D'Este & Seeley Co. (Curtis) 29 Haverhill St, Boston, Mass. (return float and expansion).
Haines, W. S. C 136 South 4th St, Phila, Pa.

Tanks, Tubs and Vats.
Caldwell Co., W. E. 202 Brook St., Louisville, Ky.
Challenge Wind Mill & Feed Mill Co, 195 High St, Boston, Mass.
Corcoran, A. J, 11 John St, New York.
Cypress Lumber Co, Apalachicola, Fla.
Stearns, A. T, Lumber Co, Neponset, Mass.
Woolford, George, 2240 No. 9th St, Phila, Pa

Tapes, Braids and Edgings.
Fleming & Chapin, 229-231 Church St, Phila, Pa.
Friedberger & Co, Germantown, Pa.
Goff, D. & Sons, Powtucket, R. I.
Krout & Fite Mfg. Co., 2632 40 Mascher St., Philadelphia.
Weimar Bros, 1817 East York St, Phila, Pa.
Young, Wm. M, 3638-40 Frankford Ave, Philadelphia, Pa.

Teasels.
Kellogg, Wm, W, Skaneateles, N. Y.

Temperature Regulators.
D'Este & Seeley Co, 29 Haverhill St, Boston.
Haines, W. S. C, 136 South 4th St, Phila, Pa.

Tentering Machines.
See Dyeing, Bleaching Machinery, Etc.

Tension Pulleys.
N. E. Ventilating & Heating Co, 930 Manton Ave, Providence, R. I.

Testing Machines.
Howard, Geo. C., 1783 Barker St., Phila., Pa

Towers.
Caldwell Co., W. E. 202 Brook St., Louisville, Ky.
Challenge Wind Mill & Feed Mill Co, Boston, Mass.

Traveler's Cheques.
American Express Company.

Turbines.
(See Water Wheels.)

Valves.
D'Este & Seeley Co, 29 Haverhill St, Boston Mass.

Ventilating Apparatus.
Allington & Curtis Mfg. Co., Saginaw, Mich., and East Cambridge, Mass.
Berry, A. Hun, 23 W. 1st St, Boston, Mass.
Massachusetts Fan Company, Room 641, 53 State St, Boston.
New England Ventilating & Heating Co, Providence, R. I.
Philadelphia Textile Machinery Co, Hancock St, above Lehigh Ave, Phila, Pa.
Sargent's, C. G., Sons, Graniteville, Mass.
Sturtevant, B. F. Co, 34 Oliver St, Boston, Mass.

Washers (Cloth).
Hopkins, A, & Co, Bridgeton, R. I.
Hunt, Rodney, Machine Co, Orange, Mass.
Hunter, Jas, Machine Co, No. Adams, Mass.
Phillips Co, The Thomas, Providence, R. I.

Watches.
Elgin, National Watch Co., Elgin, Ill.

Watchman's Clock.
Eco Magneto Clock Co, 620 Atlantic Ave, Boston.
Nanz & Co, 116A Chambers St, New York.

Water Pressure Regulators.
D'Este & Seeley Co, 29 Haverhill St, Boston.

Water Wheels.
Bradway, C. P, West Stafford, Conn.
Christiana Machine Co, Christiana, Pa.
Humphrey Machine Co., Keene, N. H.
Hunt, Rodney, Machine Co, Orange, Mass.
Leffel, James, & Co, Springfield, O.

Water Wheel Governors.
Bradway, C. P, West Stafford, Ct.
Cohoes Foundry & Machine Co, Cohoes N. Y.
Leffel, James & Co, Springfield, Ohio.
Lombard Water Wheel Governor Co, 61 Hampshire St, Boston.

Winders. (Hosiery.)
Payne, G. W. & Co, Pawtucket, R. I.
Universal Winding Co, 226 Devonshire St, Boston.

Wood Pulleys.
Saginaw Manufacturing Co, Saginaw, Mich.

Wool.
Lyon, John H, & Co, 12 Reade St, N. Y.

Wool Cleaning Compound.
India Alkali Works, Boston.

Wool Combing Machinery.
Crabb, Wm, & Co, Newark, N. J.
Crompton & Knowles Loom Works, Worcester, Mass.
Townsend, Thomas, 157 Orange St, Providence, R. I.

Wool Extracts.
Garfield Woolen Co, Garfield, N. J.

Wool and Waste Dusters.
Gerry, Geo, & Son, Athol, Mass.
Sargents', C. G., Sons, Graniteville, Mass.
Stillman-Randall Machine Co, Westerly, R. I.

Woolen and Worsted Machinery.
Altemus, W. W, & Co, 2816 N. 4th St, Phila Pa.
Butterworth, H. W. Sons Co., Philadelphia.
Cobb, Thad. S., Machinery Co., Lowell, Mass.
Crompton & Knowles Loom Works, Worcester, Mass.
Curtis & Marble Machine Co, Worcester, Mass.
Fairmount Machine Works, 22d and Wood Sts, Philadelphia.
Furbush, M. A. & Son Machine Co, Phila, Pa.
Harwood, Geo. S, & Son, 53 State St, Boston.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Hunt, Rodney, Machine Co, Orange, Mass.
Hunter, Jas, Machine Co, No. Adams, Mass.
Jefferson, Ed, & Bro, 28 Strawberry St, Phila, Pa.
Payne, G. W. & Co, Pawtucket, R. I.
Philadelphia Textile Machinery Co., Hancock and Somerset Sts., Philadelphia.
Phillips Co. The Thomas, Providence, R. I.
Sargent's, C. G., Sons, Graniteville, Mass.
Stoddard, Haserick, Richards & Co, Boston, Mass.
Woonsocket Machine & Press Co Woonsocket, R. I.
Woonsocket Napping Machine Co., Woonsocket, R. I.

Wool, Hair and Noils.
Becker, Chas. W, Agt, Amsterdam, N. Y.
Fowles & Co, 106 Church St, Phila.

Wool Shoddies.
Becker, Chas. W, Agt, Amsterdam, N. Y.
Garfield Woolen Co, Garfield, N. J.
Kennebec Woolen Mills, 2025 Naudain St, Philadelphia.
Riverdale Woolen Co, Riverdale, Northbridge, Mass.

Wool Sorters and Scourers.
Kennebec Woolen Mills, 2025 Naudain St, Philadelphia.

Wool Washing, Preparing and Drying Machinery.
Phillips Co, The Thomas, Providence, R. I.
Sargent's, C. G, Sons, Graniteville, Mass.

Yarns, Threads, Etc.

Banding.

Moore, C. & Co, 12 S. 5th St, Phila, Pa.
Warren, W, Thread Works, Westfield, Mass.
Solis, Andrew J, Jr, & Co, 179 Devonshire St, Boston, Mass.
Tucker & Cook Mfg. Co, Conway, Mass.
White, James F, & Co, N. Y. and Phila, Pa.
Whittier Cotton Mills, Lowell, Mass.

Carpet Yarns.

Fleming & Chapin, 229-231 Church St, Phila, Pa.

Cotton Yarns.

American Spinners' Cotton Yarn Exchange, 226 Devonshire St, Boston.
Burnet & Co., 24 George Sq., Glasgow, Scotland.
Catlin & Co, New York and Boston.

Clark, Wm, Co, Westerly, R. I.
Cohannet Mills, Taunton, Mass.
Dana Warp Mill, Westbrook, Me.
Eddy & Street, Providence, R. I.
Eichmann & Sternberg, 530 Broadway, cor. Spring St., N. Y.
Fleming & Chapin, 229-231 Church St, Phila, Pa.
Germantown Spinning Co, Germantown. Pa.
Grant Yarn Co, Fitchburg, Mass.
Greene & Daniels Mfg. Co, Pawtucket, R. I.
Hadley Co, Holyoke, Mass.
Hawes, O. S, & Bro, Fall River, Mass.
Holland & Webb, 487 Broadway, N. Y.
Indian Orchard Co., Indian Orchard, Mass.
Jenckes, E., Mfg. Co., Pawtucket, R. I.
Kerr Thread Co, Fall River, Mass.
King, Alex, & Co, 54 Leonard St, New York City.
Mitchell, Jas. E, & Co, Boston and Phila, Pa.
Montgomery, J. R, Co, Windsor Locks, Ct.
Monument Mills, Housatonic, Mass.
New England Thread Co, Pawtucket, R. I.
Orswell Mills, Fitchburg, Mass.
Sanford Spinning Co, Fall River, Mass.
Tucker & Cook Mfg. Co, Conway, Mass.
Whittier Cotton Mills, Lowell, Mass.

Gassed Yarns.

Greene & Daniels Mfg. Co, Pawtucket, R. I.
King, Alex, & Co, 54 Leonard St, New York.

Glazed Yarns.

Eichmann & Sternberg, 530 Broadway, cor. Spring St., N. Y.
Fleming & Chapin, 229-231 Church St, Phila, Pa.
Indian Orchard Co., Indian Orchard, Mass.
Kerr Thread Co, Fall River, Mass, and 29 Mercer St, N. Y.
King, Alex, & Co, 54 Leonard St, New York.
Malcolm Mills Co, Frankford, Pa.
Montgomery & Co, J. R, Windsor Locks, Ct.
Warren, W, Thread Works, Westfield, Mass.
Whittier Cotton Mills, Lowell, Mass.

Harness Twines.

Fawcett, Hughes, 115 Franklin St., N. Y.
Hadley Co, 95 Milk St, Boston, Mass.
Kerr Thread Co, Fall River, Mass, and 29 Mercer St, N. Y.
King, Alex, & Co, 54 Leonard St, New York.
Moore, C , & Co., (S. W. cor. 5th and Market Sts.)
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Whittier Cotton Mills, Lowell, Mass.

Hosiery and Knitting Yarns.

American Spinners' Cotton Yarn Exchange, 226 Devonshire St. Boston, Mass.
Boyer, B. F, & Co, 516 Market St. Philadelphia, Pa.
Campbell, Geo, & Co, Phila, Pa.
Clark, Wm, Co, Westerly, R. I.
Clasgens, The J. & H. Co, New Richmond, Ohio.
Cohannet Mills, Taunton, Mass.
Colchester Mills, 86-88 Franklin St, New York.
Eichmann & Sternberg, 530 Broadway, cor. Spring St , N. Y.
Fleming & Chapin, 229-231 Church St, Phila, Pa.
Germantown Spinning Co, Germantown, Pa.
Greene & Daniels Mfg. Co, Pawtucket, R. I.
Holland & Webb, 478 Broadway, N. Y.

Hyde, E. S, 223 Chestnut St, Phila, Pa.
Jenckes, E., Manufacturing Co, Pawtucket, R. I.
Kerr Thread Co, Fall River, Mass.
King, Alex, & Co, 54 Leonard St, New York.
Mitchell, James E, & Co, Phila. and Boston
Monument Mills, Housatonic, Mass.
New England Thread Co, Pawtucket, R. I.
Orswell Mills, Fitchburg, Mass.
Rockwell, E. M, Leominster, Mass.
Sanford Spinning Co, Fall River, Mass.
Shimer, Geo, & Son, 5th and Erie Sts, Camden, N. J.
Skerry, A T, & Co, 47 Leonard St, N. Y.
Walcott & Campbell Spinning Co, New York Mills, Oneida Co, N. Y.
Warren, W, Thread Works, Westfield, Mass.
White, James F, & Co, 54-56 Worth St, N. Y.
Whittier Cotton Mills, Lowell, Mass.

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Eichman & Sternberg, 530 Broadway, cor. Spring St., N. Y.
Fawcett, Hughes, 115 Franklin St., N. Y.
Holland & Webb, N. Y.

Mohair Yarns.

Eichmann & Sternberg, 530 Broadway, cor. Spring St., N. Y.
Goff, D. & Sons, Pawtucket, R. I.
Holland & Webb, New York.
Skerry, A. T, & Co, 47 Leonard St, N. Y.

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Eichmann & Sternberg, New York City.
Holland & Webb, New York.
Indian Orchard Co., Indian Orchard, Mass.
Malcolm Mills Co, 229 Chestnut St, Phila, Pa.
Montgomery & Co, J. R, Windsor Locks, Ct.
Skerry, A. T, & Co, 47 Leonard St, N. Y.

Silk Yarns.

Cheney Bros, S. Manchester and Hartford Ct.
Eddy & Street, Providence, R. I.
Eichmann & Sternberg, 530 Broadway, cor. Spring St., N. Y.
Fleming & Chapin, 229-231 Church St, Phila, Pa.
Hawes, O. S, & Bro, Fall River, Mass.
Holland & Webb, 487 Broadway, N. Y.
Ryle, Wm, & Co, 54 Howard St, N. Y.

Woolen and Merino Yarns.

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Eddy & Street, Providence, R. I.
Hyde, E. S, 223 Chestnut St, Phila, Pa.
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King, Alexander & Co, 54 Leonard St, N. Y.
Rockwell, Edward M, Leominster, Mass.
Skerry, A. T, & Co, 47 Leonard St, N. Y.
Solis, Andrew J, Jr, & Co, 179 Devonshire St, Boston, Mass.

Worsted Yarns.

Alleghany Worsted Mills, Phila, Pa.
Botany Worsted Mills, Passaic, N. J.
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Cranston Worsted Mills, Bristol, R. I.
Croft, Howland, & Sons, cor. Broadway and Jefferson Ave., Camden, N. J.
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Elsasser, Albert R, Addingham, Pa.
Goff, D. & Sons, Pawtucket, R. I.
Herbst & Jones, 21st and Naudain Sts, Philadelphia, Pa.
King, Alexander & Co, 54 Leonard St, N. Y.
Phoenix Mills Co, 13 Letitia St, Phila, Pa.
Shimer, Geo, & Son, 5th and Erie Sts, Camden, N. J.
Skerry, A. T, & Co, 47 Leonard St, N. Y.
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IF YOU **HAVE LEAKS** in your STEAM PLANT you can make them less by using EUREKA PACKING. If your engine HAMMERS, or their is OIL in the BOILER, the HINE ELIMINATOR will remedy both troubles. SEND FOR CATALOG.
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The advertisers in the following columns should be addressed in care of TEXTILE WORLD, or inquiries concerning them may be addressed directly to "Information Department, TEXTILE WORLD," as full particulars of each advertiser are on file, and the addresses of suitable agents, superintendents and foremen for every branch of the textile industry will be furnished to manufacturers.

Any subscriber may file his application, and no charge is made until position is secured.

The business of this department is held strictly confidential.

The applications of good overseers in every department, who are in want of positions, are solicited.

Manufacturers are invited to use this department when in need of skilled men; each case will be handled confidentially, with promptness and judgment, and without charge to manufacturers.

A member of the firm is in charge of this department, and gives personal attention to each case.

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1387 **Woolen Superintendent,** one who has had a thorough practical experience in setting up and operating woolen mills. Would take charge of small mill or finishing department in large mill. Now employed but wishes to change. Correspondence solicited.

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1398 **Woolen Superintendent or Designer** of recognized ability and at present employed as a superintendent of a 4 set woolen and worsted mill. He finds it necessary to remove from New Jersey on account of his wife's health. His past record is first-class and this is an unusual opportunity to secure the services of a first-class superintendent.

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1268 **Woolen** superintendent or designer. First-class experience in England and America. A first-class man in every way; age 34; married. Fancy worsteds, cheviots, novelty goods, cassimeres, overcoatings, cloakings, dress goods, piece dyes, worsteds and cheviots.

1305 **Superintendent and Designer** with 20 years' experience in woolen mills, on cassimeres, cheviots, worsteds and cloakings. Is now out of employment. Wants position at once.

1255 **Felts.** The advertiser has a thorough, practical knowledge of all the details connected with the manufacture of paper makers' felts and jackets; especially adapted for fast running machines; good reason why he is now in the market; recommended by past employers.

1250 **Superintendent,** or would accept a position as designer in a good woolen mill. Understands fancy cassimeres, cloakings, dress goods, kerseys, unions and worsteds. Can produce the Jacquard effect on an ordinary cotton, Knowles loom. Refers to good mills.

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1267 **Cotton** superintendent or carder. Prints, sheetings, ginghams, fine and coarse, white and colored. Nearly all kinds of machinery. References all right. Age 47; married.

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578 **Cotton Superintendent** with experience as boss carder, master mechanic and superintendent on prints, sheetings, twills and sateens. An American of high character, and whose ability is proved by past record. Age 35, married; can accept position at once.

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1082 **Woolen carder experienced on** all classes of underwear. Has worked for eight years in one mill, 29 years of age and married. Good references.

1190 **Woolen** Carder or Spinner. Age 47; married. One reeler and one piecer in family. Has been overseer and spinner for the last fifteen years for one firm, which is now out of business. Refers to past employers. Can take position at once. Familiar with wool shoddy and cotton; Furbush, Lee and other makes of machinery.

1378 **Overseer Woolen Carding.** American, age 32, married. With one mill 13 years, and another 4 years. Excellent references from each. A first-class carder in every way.

1367 **Boss Carder** of wool, shoddy, or cotton. More than 12 years experience as boss carder in leading knitting mills in N. Y. At present employed but desires to change for $3 00 a day or better. Can take charge of mule spinning also. Married; age 36; American.

1286 First-class Carder, now employed, wishes a better position. Has the best of references from good mills. Excellent manager of help. Age 35; married. Experience on broadcloth, dress goods, covert cloth and meltons.

1270 **A 1 Carder,** wool or cotton, 11 years experience, first-class references, reliable, temperate and industrious, desires immediate position. Age 30. Will go any where.

1307 **Carder** with unusually fine record and very wide experience desires good position in New England, Central or Western States. First class references from past positions. Age 44. Experience on cassimeres, cheviots, dress goods, broad-cloth, repellants and blankets.

COTTON CARDERS.

1339 **Cotton Carder,** young man holding first-class position in New York State, would like position in Eastern or Middle States as assistant superintendent or boss carder paying $5.00 or more a day. Is worth that salary; experience and references of the best.

1368 **Overseer on Second-Hand Cotton** Carding wants a position in small room at $2.50 per day or upwards. Will do his own grinding. Or, would take a first-class second hand job. Last five years in one place. Thoroughly practical and understands all the machinery in the card room. Age 37; married. Good reference. Prefers New England.

1384 **Second Cotton Carder.** Energetic student at Lowell Textile School wants position in a mill until Oct. 1st 1898. Only expects enough pay to cover living expenses. A bright young man not afraid of hard work.

1315 **Cotton Carder.** Over 20 years' experience as overseer in first class mills. At present employed. Well up on prints and light and heavy sheetings. Knows American and English cards, and speeders. Best references.

WOOLEN SPINNERS.

1299 Woolen Spinner who has had experience as second-hand would like a position as boss spinner. Would accept small salary to start. Has worked on cloakings, dress goods and Scotch tweeds in New England mill.

1287 **Young Man** wants position as boss spinner. Experience in first-class mills on cassimeres, kerseys, cheviots, satinets; knows Davis & Furber, Paul and Johnson & Bassett machines. Age 29. Wife works in mill.

1195 **Spinner, Woolen.** American; age 31; married. Experienced on yarns from 1 to 7 1-2 run. Refers to past and present employers. Wants position as overseer. Will not go to Southern States, Canada or Connecticut. Is an experienced overseer.

1374 **Overseer Woolen Spinning.** All makes of mules, has had charge in good mills. Experience covers yarns for hosiery, fancy woolens and worsteds. Age 28; married.

633 **Woolen Mule Spinner** desires to move from Maine on account of wife's health. At present in good position. Age 37; married, Scotchman.

1204 **Situation wanted** as boss spinner, or second hand and mule fixer on Platt mules. Many years experience on yarns for dress goods in England, and also yarns for fine woolen cloth. 35 years old and married; good references.

1316 **Overseer Worsted Drawing** and spinning. Will accept first class position at $3 or more per day. At present employed in well known and first class mill. Age 42. Married. Best references from former employers.

COTTON SPINNERS.

1284 **Eleven years as Overseer** in first-class gingham mill, with other experience, has fitted this man for good position in charge of ring spinning, spooling and warping. Age 40. French American; married.

1272 **Second Hand** of cotton ring spinning wants position in Massachusetts, Rhode Island, Maine or New York. Age 23; married.

1364 **Cotton Spinner, mules or frames** Early training in England, 5 years in New England mills, yarn 20s to 120s. Because of misfortune would accept second hand job. Excellent reference for character and ability. Age 32, married.

1350 **First-Class Ring Spinning** overseer, also spooling, warping, slashing, web drawing; large experience, highest references as to skill, character and executive ability. At present employed in Fall River. Age 48, American.

1344 **Mule or Frame Spinner,** is at present employed in first-class print cloth mill in New England, where he has been for 9 years. Can take charge of room. Age 28, married; good references from present place. Wants $3.00 or more.

1370 **Overseer Cotton Ring Spinning** At present second hand in a large Maine mill. 12 years experience in spinning. Age 34; not married. High references from past and present employers.

WOOLEN WEAVERS.

1340 **Worsted Weaver** would like position in a small mill at moderate salary; experience as fixer and in cloth room. Age 38, married. Knowles and Crompton looms; references good.

1130 **Overseer of Woolen Weaving** wants position. Would accept 2nd hand's position in a good mill. American; protestant; age 36; single. Good man on Knowles fancy and plain looms, also Davis & Furber. Cassimeres, worsteds, meltons and flannels. Will not go South, West or Pennsylvania.

1099 **Woolen Weaver** on dress goods, cassimeres, unions and worsteds. At present out of work because of mill shutting down. Has an excellent record and refers to well-known men. Willing to start on moderate wages. Age 41; married.

1385 **Worsted or Woolen Weaver** of fancy worsted and woolen mens' wear and novelty dress goods. Has held positions in leading N. E. and Phila. mills. Expert on Crompton & Knowles looms: Best references. Age 38; married. Can start at once.

1313 **Woolen Weaver.** First class references, and experience on fancy cassimeres, kerseys, beavers, dress goods, etc. At present not employed, for good reasons. Age 44. Married.

140 **Worsted Weaving Overseer** with 12 years' experience as overseer, designer, and superintendent. Has tried another business for a few months and now wants to go back to the mill. Excellent references, habits all right. A skillful weaver and manager. Age 33, married, American.

COTTON WEAVERS.

1380 **Overseer Cotton Weaving.** Held overseer's position for 5 years in Mass. mill, but now out because of change in management. A man of well-known ability. Age 48; married, American. One of the best weavers in New England. Will go South to a good position.

1373 **Overseer Cotton Weaving.** A man with especially good opportunities to gain wide experience in large Mass. mills; now second hand, having worked up from hand boy. American, age 29, married; best of references.

1392 **Cotton Weaver,** with first-class record in R. I. mills, desires to change for position paying $2.50 or more. Experienced on sheetings, lawns, sateens, twills, etc. Excellent references. Age 35, married.

1353 **Overseer Cotton Weaving,** who has worked up from fixer to overseer in good mills, wants position paying $3.00 or more. Scotch, age 29; experience on all kinds sheetings and sateens.

1334 **Jacquard and Dobby Weaver** and designer on Knowles machines. 8 years' experience in this position. At present employed and can furnish excellent references. Age 38; married.

1333 **Overseer of Cotton Weaving** with more than 20 years' experience in weave rooms of N. E. and Canadian mills. Experience on all kinds of white and colored, plain and fancy work, except Jacquard, American and English, looms. Married; age 37.

1247 **Elastic** weaver wants position as overseer. Used to cotton web, elastic suspenders, silk neckwear, dress goods and handkerchiefs. 28.

DYERS.

1354 **Dyer of Large Experience** both in woolen mills and in job dyehouses. A man of far more than average skill from raw stock to piece dyeing, dress goods, etc. Scotch, married; age 39.

1355 **Wool and worsted Dyer,** a young man with 5 years' training by one of the best dyers at one of the largest mills in N. E. Experience on worsted and woolen cheviots, clays, worsteds, suitings, cloakings, beavers, dress goods, carriage cloths, yarn, slubbing, wool. Would be able to take charge of small high grade small plant.

1360 **Wool Dyer or Assistant,** 6 years' training as assistant on shoddy and wool piece dyeing. French American, age 24, single, well recommended.

1361 **Wool Dyer and Finisher,** large experience on blankets, all kinds of flannels, felts and dress goods. Early training in Scotland, 15 years in this country. Now employed, but wants to locate in the North near the sea. Age 40, married; now giving entire satisfaction.

1382 **Cotton Piece Dyer.** 12 years at last place. Experienced in all kinds of cotton goods. Englishman, age 37, married. Well recommended for character and ability.

1393 **Knit Goods Dyer** who has had 18 yrs. experience in first-class mills, desires to make a change. Is capable of taking the management of a cotton underwear mill. Best of references. Age 42; married, American.

1377 **Woolen Dyer** with experience on a great variety of goods, including raw wool, yarns, carriage cloth, satinets, kerseys, beavers, repellents, men's suitings; well recommended. Would start at $2.50 a day. Age 32; married.

FINISHERS.

1351 **Woolen and Worsted Finisher** with 7 years' experience as overseer in R. I. and N. Y. mills, from which he has excellent references. At present second hand in one of the best worsted mills in N. E. Habits first-class; age 29, married.

1359 **Woolen Finisher** of all kinds of woolen goods; 20 years in charge, at three leading mills. At present out of employment; expects $4.00 a day. Age 45, married; references first class.

1041 **Woolen Finisher.** Has had experience on fancy and piece dyed goods, cassmeretes, cheviots, worsteds, kerseys and dress goods. Wants position as overseer or second hand in New England States. Age 26 years. Will work for $2.50 per day.

1330 **Expert Finisher** with 10 years' experience in European mills. Can do perfect work on highest grade cassimeres, serges, cheviots, kerseys, worsteds, astrachans. Age 34; married. German, speaks English imperfectly.

1376 **Finisher** of all grades of woolens and worsteds, wet or dry. 8 years experience in England and 6 years in this country. Now employed as overseer but wants to change location. Age 30; married.

1396 **Wool Finisher.** This man has had a very large experience among well-known mills and refers to past employers. Character and ability of the first order.

KNITTERS.

1274 A man who thoroughly understands the manufacture of hosiery from the fleece to the case, and is a good manager. Desires to correspond with parties wishing to employ such a man.

1362 **Boss Rib Knitter**, young man, now second hand in fleece lined underwear mill in New York State wants to advance. Very highly spoken of by present employers as to both ability and character. Could change on short notice.

1317 **Knitting Overseer.** Wide experience. Age 36. Married. Has worked on fleece lined underwear, elder downs, stockinet, jerseys, etc. Familiar with spring needle circular machines First class references.

1342 **Hosiery or Underwear Supt.** A practical knitter familiar with latch, spring needle, and sewing machines; nearly 15 years superintendent of New England hosiery mill, at present shut down. Good manager; references first-class. Age 47; married.

1389 **Knitting Machine Fixer.** Early training as general machinist. Was for several years with Philadelphia mills on underwear, mittens, etc. Very reliable, age 31; not married, American.

1391 **Boss Knitter** who has the very best references. Now employed but wants more pay. Would change for $3.50 a day. Experienced in both hosiery and underwear. Age 32; married, American.

1371 **Cotton Hosiery Supt.** Has had charge of hosiery mill in N. C. Would like a western mill. Refers to last position. Young man, not married.

DESIGNERS.

1275 **Designer** or assistant. Age 25; married. A good man on cotton or worsted fancy dress goods. Jacquard and box looms.

1263 **Assistant** Designer or Assistant Superintendent. Has received a practical mill experience, and is a graduate of the Philadelphia Textile School. Unions, cassimeres, suiting, cloakings. Age 24 years.

1252 **Designer, Weaver or Dresser.** Aged 40 years; married. Familiar with nearly all kinds of men's wear, piece dyes, etc. Refers to past and present employers.

1259 **Woolen Designer or Supt.**, 10 years' experience on meltons, kerseys, beavers, and dress goods. Thorough knowledge of color mixing and picking out. Best of references from past positions. Age 39, single.

1397 **Cotton Designer or Weaver.** A young man with unusual opportunities and experience in England, now holding a position in a leading mill in Connecticut, desires to advance. Refers to several prominent mill men and would make a progressive designer for a mill running on Jacquards, Lappet or Lenos.

1383 **English Woolen Designer.** 20 years in leading Yorkshire and Huddersfield mills as designer, supt. and weaver. Very large experience and would accept moderate salary in good mill. Age 36; married, English.

9999 **Superintendent Print Works.** Young man, 30 years of age, energetic and practical, graduate chemist, with thorough experience in printing, especially of silk (2 years in Europe and 4 in this country), seeks position as superintendent or assistant in print works. Address Chemist, care TEXTILE WORLD.

MISCELLANEOUS.

1365 **Assistant Supt. Underwear** Mill. Experience mostly on flat goods, is an expert bookkeeper, understands making cheap goods, finishing, and general knowledge of machinery. Moderate salary. Age 39, married, American.

1301 **Book-keeper and Paymaster.** Young man of the very highest character desires to move away from the Atlantic coast, on account of his health. Best references from his present and former employers.

1393 **Practical Chemist.** Experience covers three years in English and German textile schools and 17 years in New England mills, bleacheries and print works. Has practical knowledge of all departments of a bleachery, and would accept position in the South. Age 39; married; American.

1381 **Cloth Examiner.** Worsteds or woolens. German, age 50, single. Man of high character, 9 years in one of the leading N. E. mills and also in large N. Y. clothing houses. Best of references.

1395 **Overseer of Slashing, Spooling**, warping and dressing, a man who thoroughly understands his business and has excellent habits, well recommended from leading mills. Age 42; married, English.

1379 **Overseer, Cloth Room.** Out of work because of change in management. A man with first-class record and wide experience. Refers to several prominent mill men. Age 39; married, American.

1375 **Machinist.** Practical man who has worked on cotton machinery for many years and has excellent references. American, age 29; married. Can start work at once at $2.25 a day.

1336 **Beaming and Slashing.** Experience in Mass. and Me. cotton mills on ginghams, dress goods and all kinds colored goods. Age 30; habits first-class, good references. At present employed in large mill.

1335 **Loom Fixer or Second Hand.** Knowles and Crompton looms, fancy worsteds and cassimeres, dress goods. German; Protestant; age 37, married. Has been employed in good mills and is very well recommended.

1372 **Wool Sorter.** Young man with excellent training in R. I. mill. Will start at $2.00 a day. Refers to past employers.

1312 **Overseer Dresser.** Age 34. Married. Is at present working in a first class mill. Desires to change because of poor health of family. Can furnish first class references. Cassimeres, unions, woolens.

1363 **Twisting, Spooling, Warping** overseer. Experience on single and twisted yarns up to 2/100s in one of the best New England mills. Now employed as assistant; young man, but is confident that he could satisfactorily fill overseer position.

1356 **Second Hand Cotton Spooling**, warping, twisting, slashing, or could handle overseer position in small mill. Well recommended, now with good mill.

1202 **Silk Superintendent** is open for an engagement with a first-class company. Has a thorough knowledge of all the details connected with the manufacturing of silk ribbons and hat bands, from throwing to the finished product. Has held the position of superintendent of a first-class mill for several years. Under 30 years of age, and married. Has the best of references. For any further information address this paper.

TEXTILE BOOKS.

The following are recent publications, which we will furnish upon receipt of their price.

Plain Series of Cotton Spinning Calculations, by William H. Cook, 91 pages.

This book gives original calculations relating to cotton spinning, giving the position of the different pulleys and wheels, which are taken into consideration when making calculations; and also points where the necessary changes are made when altering from one count to another. Price $1.

The Student's Hand-Book of Practical Fabric Structure, by H. Neville. 8vo., 235 pages.

The object of this work is to interest the student in the subject of weaving by a series of consecutive lessons in the principles of fabric structure. Free use is made of sectional diagrams, to show what actually takes place in producing any particular fabric. An idea may be had of the nature of the book from the following partial enumeration of the subjects treated: Design Paper and Its Uses; Plain Cloth and Its Ornamentation, Twilling, Drafts and Tie-ups; Spotting; Open-work Effects; Cords; Pile Weaving; Cross Weaving; and Backed and Double Cloth. Price $2.25.

The Printing of Textile Fabrics, by C. F Seymour Rothwell. 8vo., 312 pages.

This is a practical manual on the printing of cotton, wool, silk, and half-silk fabrics, with plates, illustrations in the text, and specimens of printed fabrics. The work contains but little information of a purely chemical or theoretical character, as it has been covered by the "Manual of Dyeing," by Knecht, and others. The author has confined himself more to the practical side of the subject, and the processes and machinery described by him are principally those with which he has had practical experience. Price $6.50.

Cotton Spinning, by W. S. Taggart

Two volumes of this work have been issued; the second volume brings cotton spinning down to the end of what is generally termed the preparing processes and includes all of the machinery and manipulations between the card and the self-actor, or ring frame. This work is esteemed of much assistance to the student. Price $1.75.

Ornamental Design for Woven Fabrics, by Stephenson & Suddards. 273 pages, 66 illustrations.

This is a text book dealing with ornamental design for woven fabrics, for the use of the student, and has been written for the purpose of suggesting helpful ideas to designers and manufacturers of textiles, and aims at bringing artistic textile work into practical touch and closer relationship with the technical requirements of manufacturing. It takes up such subjects as Geometric Design; How to Plan an All-over Repeating Design; The Drop Pattern; The Sateen Arrangements; Borders, Corners, Stripes; The Structure of Ornamental Flowers, Foliage, etc. Price $2.50.

The Power Loom, by Alexander Brown.

This is a practical, well written treatise of 118 pages, on the construction of the power loom and the art of weaving, giving descriptions of the texture produced by different numbers of harnesses. The text is illustrated with diagrams, and contains calculations and instructions for the production of cotton, woolen, linen and jute fabrics. It was written with the intention of serving as a text book for those engaged in the trade. Notwithstanding it relates to English machinery, it is of value to those operating that of American make. Price $1.25.

Jacquard Weaving and Designing, by T. F. Bell. 300 pages. Fully illustrated.

The contents of this work have been derived from a long course of art and technical training, together with a lengthy practical experience in textile manufacturing and designing, by the author. The descriptions are as concise as is compatible with fairly clear explanation. Price $3.00.

Cotton Weaving and Designing, by John R. Taylor, 288 pages, fully illustrated.

This work is by a well known writer and lecturer on this subject, and treats of such topics as: Hand and Power Looms; Drop and Circular Box Looms; Dobbies; Jacquard and Leno Weaving; Terry Looms; Principles of Designing, Plain and Figured; and Textile Calculations. This work is of much value. Price $2.50.

Woolen Spinning, by Charles Vickerman.

This is a most excellent work for students in textile schools, and for skillful, practical men in woolen mills. It takes up the principles that underlie the various processes and operations of the earlier parts of manufacture. It has chapters devoted to Wool; Wool Sorting; Scouring; Bleaching; Mixing, etc., Carding and Spinning. 352 pages. Price $1.75.

The Student's Cotton Spinning, by Joseph Nasmith.

This is a standard book on spinning. It treats of mixing, opening, scutching, carding, card clothing, combing, roving, spinning, reeling, waste spinning, etc. 393 pages. Price $2.50.

Technology of Textile Design, by E. A. Posselt.

As a practical treatise on the construction and application of weaves, and the analysis of cloth, this is, in very many respects, the best work for the American manufacturer that is published. Price $5.00.

The Mechanism of Weaving, by T. W. Fox.

A treatise of 464 pages, presenting exact and practical information upon the principles of weaving. Takes up such topics as Harnesses; Shedding; Dobbies; Jacquards; Card Cutting; Picking; Pickers; Swivel Weaving; Beating Up; The Reed; Taking-up Motion; Temples; Trimming and Fixing of Parts. 256 illustrations. Price $2.50.

Manual of Dyeing, by Knecht, Rawson and Loewenthal. In three volumes.

Decidedly the best work of the kind for a proper understanding of the present state of the art of dyeing, for the use of practical dyers, manufacturers and students. It takes up such subjects as, Water; Acids; Alkalies; Mordants; Natural and Artificial Coloring Matter; Machinery used for dyeing, etc. Has numerous illustrations and specimens of dyed fabrics. Price $15.00.

Patents.

(Continued from page 18.)

Hat Body Sizing Machine. 603,906. Chas. E. Keator, Brooklyn, N. Y., assignor of one-half to Dunlap & Co., Brooklyn and New York, N. Y.

Heddle-Bar Locking-Clamp. 603,808. M. J. Armstead, Lowell, Mass., assignor to Draper Co., Portland, Me., and Hopedale, Mass.

Knit Pile Fabric. Ribbed. 603,164. T. S. Baron and W. A. Ingalls, assignors to Baron, Straus & Co., Brooklyn, N. Y.

Knit Fabric for Underwear, etc. 602,702. D. F. Halstead, Brooklyn, N. Y.

Knitting Machine. 604,100. Frank B. Wildman, Norristown, Pa., assignor to the McMichael & Wildman Mfg. Co. of Pennsylvania.

Knitting Machine Stop-Motion. Circular. 604,344. Albert White and Daniel F. Sullivan, Lowell, Mass., said Sullivan assignor to Mary Sullivan, same place.

Loom for Cross-Weaving. 603,287. W. H. Redding, assignor to Crompton & Knowles Loom Works, Worcester, Mass.

Loom. Lappet. 603,521. H. Wyman, assignor to Crompton & Knowles Loom Works, Worcester, Mass.

Loom Shedding Mechanism. 603,308. Horace Wyman and W. H. Redding, assignors to Crompton & Knowles Loom Works, Worcester, Mass.

Loom Shedding Motion. 603,282. G. Oldham, Philadelphia, Penn.

Loom-Shuttle. 603,603. S. M. Hamblin, Taunton, Mass., assignor of three-fourths to W. H. Goldsmith, Central Falls, R. I.

Loom Shuttle Box Operating Mechanism. 603,522 H. Wyman, assignor to Crompton & Knowles Loom Works, Worcester, Mass.

Loom Jacquard Mechanism. 604,299. Thomas A. B. Carver, London, Eng.

Loom Protector Stop Mechanism. 603,860. O. A. Sawyer and M. M. Lahue, Lowell, Mass., said Sawyer assignor to said Lahue.

Loom Fork. 602,893. John Catterall, New Bedford, Mass.

Loom Heddles. Machine for Making. 603,080. G. W. and W. R. Harris, Lowell, Mass.

Loom Shuttle. 603,141. Stephen M. Hamblin, Taunton, Mass., assignor of three-fourths to W. H. Goldsmith, Central Falls, R. I.

Loom. 602,491. J. Walder (deceased), Paterson, N. J., M. Walder, executrix.

Piled Fabric Cutting Apparatus. 603,224. J. Platt, Warrington, England.

Spinning and Twisting Machine Spindle. 604,194. John E Prest, Cohoes, N. Y.

Seed Cleaning Machine. Cotton. 603,448. J. A. Lewis, Meridian, Miss.

Spinning-Spindle. 602,987. W. Hinchliffe, Huntsville, Ala., assignor to Draper Co., Portland, Me., and Hopedale, Mass.

Spinning Textile Fibres. Apparatus for. 603,068. R. Todd, Heaton Chapel and J. A. Stott, Manchester, England.

Textile Roller Clearer. 602,626. R. S. Matteson, assignor of two-thirds to C. H. Field, Providence, R. I., and J. A. King, Seekonk, Mass.

Undergarment. 604,163. Adolph G. Velasko, Syracuse, N. Y.

Warp From Narrow or Short Supply Beams. Means for Forming Wide Sheds of. 603,407. Isaac E. Palmer, Middletown, Conn.

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Stamps will do.

We have purchased from the author, W. S. Kelley, the balance of the edition of his pamphlet on Cotton Preparation and the Standard Yarn Tables. Although published ten years ago, much of the matter is as good as ever and well worth 10 cents, at which price we will close them out.

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G. F. care of Textile World.

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A factory with Railroad Switch east of New Haven. Cost $30,000, price $8,500. 20,000 feet floor space, 100 horse power boiler, 85 horse power Corliss engine. Village and help. Special inducements. Particulars and photographs on application. (Folio 8345).
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A new plant, capacity 100 dozen per day.
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—New Hampshire, Lebanon. The Riverside Woolen Co. has received a government contract for 300,000 yards of cloth for uniform linings.

—New Hampshire, Tilton. Some of the machinery of the Granite Hosiery Mills has been sent to the mill at Columbia, S. C., owned by G. H. Tilton, and it is understood that new machinery will replace it at Tilton.

—New York, Baldwinsville. The knitting mill of J. C. & J. C. Miller, which recently started up, has now received an order for 200,000 shirts from government.

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Fully acquainted with the knitting business, who can furnish $10,000 capital, to unite with the proprietor of a fully equipped 8 set mill in running the same. Very favorable terms will be made with men of exceptionably good character and standing. Reference required. Address
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NOVELTY COTTON YARNS,

FROM AMERICAN PEELERS AND EGYPTIAN COTTONS.

OUR SPECIALTY: Superior qualities of Hosiery Yarns, Natural Shades of Cottons, and in Colors, Jaegers, Mixes, and Bleached, Hosiery Cops on Long Tubes, Skeins, Tubes, Cones and Lisle Thread Yarns. Furnished in Carded and Combed Qualities in Singles, 2, 3 and 4-plies.

The Best is the Cheapest.

It is BETTER and CHEAPER to wind yarn by the "Universal" system before shipment from the mill, thus insuring perfect delivery to knitting machines without rewinding.

UNIVERSAL WINDING CO.,

F. H. BISHOP, Manager.

226 Devonshire St., - Boston, Mass.

YARN DEPARTMENT.

Eastern Yarn Market.

Cotton Yarn. The orders for 2/30s, 2/40's and other yarn used by woolen mills have fallen off materially since last month. Up to April, yarn of this class could not be secured in quantities large enough to supply the demand and prices were advanced wholly because of an insufficient supply. With the reduced demand comes lower prices for this yarn. It is noticeable in this respect that the demands ceased after eight or ten days of its highest production. It may have been caused by the war, or it may be, that now that deliveries of woolens made with this yarn is on, that the amount of cloth rejected, because of the great percentage of cotton yarn, has scared the woolen manufacturers.

The combination of spinners is still in working order and prices are fully maintained. The tendency of the combination is more toward the curtailment of production than the lowering of prices. This is surely good judgment as knitters placed orders largely in February when the knitters of cotton fabrics were securing large orders and delivering quantities of cotton garments. Spinners have orders at established prices, but have no specification for deliveries. With this state of affairs it is not likely that they will lower prices. The knitters themselves are having many orders cancelled which were placed early in the year. The spinners have been bothered considerably by the cotton weavers of the large mills whose looms are now stopped. These mills are selling cop yarn and ring spun. The Southern spinners continue to compete with the Northern mills and offer inducement by lowering prices although they seek to get as near the combination price as possible.

The demand from the knitters is largely for white cop yarn as that is the style most in demand for heavy weight. The exception being a colored yarn in Silver Gray for ladies underwear and Jaeger for men's ribbed underwear. Colored is being sold in fine numbers from 1/24 to 30s for fleece-lined flat underwear, and it is to be noted that this class of garment is taking the place largely of woolen underwear. How long this will continue can only be determined when the garment has been thoroughly tested. Light weight Lisle underwear orders are still coming forward and the chances are that it will continue long into not weather. Balbriggan underwear still continues in demand. It is noted however, that the spinners of fine yarns are not so well employed and are willing to take orders where heretofore they were well employed. Knitters are finding much fault with the action of the jobbers in refusing to take orders on time which is strengthing the determination of many to sell only to the retail consumers. Cotton hosiery is in poor demand, and prices are nominal.

We quote:

7/8 white cops	13½ cts.
10s " "	14 cts.
12s " "	14½ cts.
14s " "	15 cts.
16s " "	15½ cts.
18s " "	16½ cts.
20s " "	17 cts.
Silver gray and Jaeger.	
10, 11, 12	16 cts.
14	16½ cts.
16	17 cts.
18	17½ cts.
20	18 cts.
Combed Egyptian, 1/20,	24 cts.
" " 1/30,	30 cts.
" " 1/40,	34½ cts.
" " 1/50,	37 cts.

Worsted Yarn. Spinners are getting but few orders and are curtailing production. Many are running but four days per week and some have shut down entirely. One large spinner-weaver with thousands of spindles, is running but two frames, and 800 out of 1300 broad looms are idle. This mill is liable to start up at any time. Prices

(Continued on page 131.)

Frank E. Patterson, Prest. Oscar W. Wood, Treas

Germantown Spinning Co.

COTTON CARDED

HOSIERY YARNS

In numbers from 6s to 26s.

Germantown, Philadelphia.

W. Warren Thread Works,

WESTFIELD, MASS.

HOSIERY AND SEAMING YARNS.

Also Polished Threads.

Our bleaching and dyeing facilities are new and unsurpassed for prompt and neat work. Correspondence solicited.

WEAVING and HOSIERY YARNS.

We Buy for Cash

WARPS, COPS, TWIST and SOFT SKEINS, Single, Double, 3-ply, 4-ply, etc.

COLORED YARNS for HOSIERY

on Cones, a Specialty.

Correspondence Solicited.

EDWARD S. HYDE, 223 and 225 Chestnut Street, PHILADELPHIA PA.

MONUMENT MILLS,

Manufacturers of

White, Colored, Fancy and Double and Twist,

COTTON WARPS

HOUSATONIC, MASS. 4s to 60s.

YARNS

SOLIS : : BOSTON.

179 Devonshire Street.

ANDREW J. SOLIS, Jr. & CO.

(Continued from page 129.)

for yarn are being firmly held, for inquiry, but concessions will be made where business is apparent. Now that deliveries are beginning to be made, the folly of trying to manufacture cloth at old prices in the face of an advance in wool of over 100 per cent. is becoming more and more apparent. In some instances manufacturers, trying to make prices please buyers, agreed to deliver 22 ounce goods and are actually delivering but 19 ounce goods, and in other instances they agreed to sell cloth at old price by substituting a little cotton. Actual deliveries show the cloth to be filled, cotton making the fabric as stiff as a board. The buyers are kicking and refuse to accept the cloth at any price. Hence it is that the manufacturers will have worked without profit and also have cheap cloth which is little better than canvas to sell, if they can. It would have been far better had the mills closed their doors than to have tried to beat the conditions which confronted them.

The only concerns doing any amount of business are those mills manufacturing flag bunting, and with these mills cloth cannot be produced fast enough. One manufacturer told the writer it put him in mind of old '61 times. To meet the demand more looms are being purchased. Prices for bunting have advanced 50 per cent., and if the demands hold out, much profit will result. One would suppose this state of affairs would aid spinners to a certain extent but the facts will not bare this assumption out. In speaking with a weaver of this cloth, the writer was informed that this mill in question had more yarn ordered than they wanted, they said they had yarn purchased which was manufactured nine months ago, and they were afraid if they did not get started on it the moths would. The deduction we make is this. That manufacturers purchased largely of worsted yarn; the yarn in many instances is made up and the weavers and knitters are

(Continued on page 133.)

CATLIN & CO.,
YARNS.
67 Chauncy St., Boston
216 Church St., New York.
206 Chestnut St., Philadelphia.

ALEX'R KING & CO.
YARNS.
FINE IMPORTED YARNS A SPECIALTY.
54 Leonard St., New York.

JAMES E. MITCHELL & CO.,
Commission Merchants.
122 & 124 Chestnut St., Philadelpia, Pa.
51 & 53 Summer St., Boston.
Cotton, Woolen & Worsted Yarns.
All numbers on Hand and Made to Order.

O. S. HAWES & BRO.,
WEAVING and HOSIERY **YARNS,**
All Plies and Numbers.
Imported Yarns a Specialty.
82 and 84 BEDFORD ST., FALL RIVER, MASS.

TUCKER & COOK MFG. CO
MANUFACTURERS OF
WHITE AND COLORED COTTON **WARPS**
Nos. 6s to 30s,
On Beams, Jack Spools or in Chain
CONWAY, MASS.

GRANT YARN CO.,
COMBED AND CARDED COTTON
YARNS 42s and above. AND
FITCHBURG, MASS. **WARPS**

E. JENCKES MFG. CO.
Colored Cotton, Hosiery, Woolen and Merino **YARNS**
PAWTUCKET, R. I.

LINEN YARN IMPORTER.
Hughes Fawcett, 115 Franklin St., New York,
Flax, Hemp & Jute Line and Tow Yarns,
FOR WEAVING PURPOSES
Linen Jacquard Harness Twines.
Fine Cotton Harness and Heddle Twines.
For Cotton, Silk, Woolen and Carpet manufacturers. Correspondence solicited. Samples promptly furnished.

CAPACITY, 50,000 Spindles.

ORSWELL MILLS

FITCHBURG MASS.

COMBED OR CARDED

COTTON YARNS

In Chains and Skeins, on Balls, Beams, Spools—single or twisted.

The J. R. MONTGOMERY CO.,

WINDSOR LOCKS, CONN.

Mercerized Cotton Yarn in two or more ply. Gives a permanent lustre equal to spun silk.

Novelty Yarns, Mohair Loops, Cotton Flake and Nub Yarns.

High Grade Cotton Warps, in colors, on beams, in chain warps or in skeins, single or two-ply.

Printers of Cotton, Wool, Worsted or Silk Yarns.

Cotton Warps.

WHITTIER COTTON MILLS,
LOWELL, MASS.

Colchester Mills,
SPINNERS OF

Made from Colchester Mills Sanitary Random Yarn

Mule Spun Cotton
Hosiery Yarns.

Sales in Charge of A. D. SALKELD, 80 & 86 Franklin St., NEW YORK.
Representing B. B. Smalley, Thos. F. Patterson, F. E. Snow Receivers Colchester Mills.

ALBERT R. ELSASSER,
Clifton Worsted Mills.
Lustre Worsted Roving and Yarns
A SPECIALTY.
MILLS: ADDINGHAM, DEL. CO. PA.

INDIAN ORCHARD CO.,

Indian Orchard, Mass.

MANUFACTURERS OF

Lustred Cotton Yarns.
In Various Colors and Twists.

NOVELTY YARNS
In Cotton, Silk and Worsted, in various patterns and colors.

Cotton Warps and Yarns
In Gray and all colors, single or 2, 3, 4 and 6 ply, and Cable Cord.

COLORED COTTON
Machined, Carded or in Roving.

(Continued from page 131.)

left on securing orders, or have been using cotton yarn in place of worsted yarn. Knitters placed orders six months ago and have been carrying yarn which could be purchased to-day at a lower price. The way the market has worked has been best for those who held out of the market and only purchased when orders had been secured for cloth. What the future will bring forth if manufacturers do not secure orders for cloth no one can foretell. In the case of bunting for flags the demand for this article is so great that manufacturers who never before manufactured a yard are taking out samples. How they will come out is a question. One large mill that never before manufactured bunting is running its mill until 11.30 at night. The Astrachan cloth business is flat. It is undoubtedly a fact that we are sure to see within six months one of the greatest booms this country has ever seen, everything is pointing in that direction and it is bound to come.

We quote:

2/40s Australian	$1.07½
2/50s "	1.15
2/20s, 3/8s Blood	.60
2/36s, 1/2 "	.75

Woolen Yarn. Spinners are getting no orders, although some sample orders are being placed. Some spinners tell us that they have orders on their books which would run them four to five months as hard as their mills can work, but no deliveries will be named and spinners are shut down in consequence. Those having placed orders are desirous of holding on to them and will be allowed to do so until spinners get new orders when the chances are, that these weavers trying to hold on without giving deliveries will get left on the low prices. The consumers are surely to have a day of reckoning, and it will be a hard lesson. We should not lose sight of the fact that we now have a protective tariff and if this state of affairs continues there will be no spinners, and those who stay in the game will have the consumers at a great disadvantage. We should not look on the dark side of affairs, but the experience of a spinner who has been 50 years in the trade is worth considering. At this time in 1893 the spinner in question had a clear surplus of $75,000 but since that time it has been a fight for existence. The present war was the last straw and the end came. Last January the concern had orders which would run the mill night and day until June. As the mill secured orders they covered with stock to take care of them. The slump came in wool and with it the tightened money market. The people to whom yarn was sold refused to pay their bills, and those who had orders, either refused to take the yarn and cancelled orders, or refused to give shipping instructions. Business being at a standstill, settled it, and the firm failed.

Many of the manufacturers have made bids for government work. If successful, the spinners will get orders to start up. Many thousand

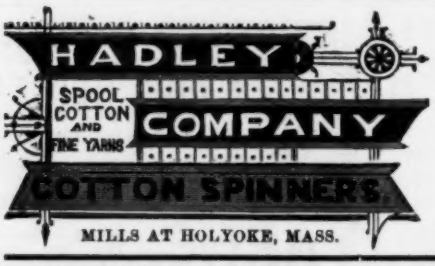
(Continued on page 135.)

KERR THREAD CO.
—SPINNERS OF—
Fine Combed Sea Island **COP SINGLES**
All Numbers, 30s to 150s.
Fall River, Mass.

WOOLEN AND MERINO YARNS.
Special line for Bicycle and Golf Goods in all shades
For Hosiery, Gloves, Underwear, and all kinds Knit Goods. Cop, Cone and Skeins.
The J. & H. Clasgens Co.
New Richmond, O.

WOOLEN YARNS.
All grades Woolen, Mixed and Merino yarns.
15 SETS CARDS.
EDWARD M. ROCKWELL,
LEOMINSTER, - MASS.

A. HERBST. J. W. JONES.
HERBST & JONES,
Successors to Kershaw Worsted Co.
WORSTED YARN SPINNERS,
21st & Naudain Streets,
PHILADELPHIA.



MILLS AT HOLYOKE, MASS.

SPINNERS OF

FINE COTTON YARNS

30s TO 100s.

Gray, Bleached, or Colored. On cop, in skein on spools, cones or tubes.

Fine Cotton Warps, single and two-ply, in chain, etc.

Spool Cotton and Seaming Thread.

95 Milk St., BOSTON.

THE WILLIAM CLARK COMPANY,

WESTERLY, R. I.

Mills equipped with the latest and most improved machinery.

Combed Egyptian from No. 20s to 100s. Combed Sea Island from No. 40s to 200s.

Also 2, 3, 4, 5 ply and 6, 9 and 12 ply cable laid.

Hosiery Yarns on Cops Tubes or in Skeins, Grey, Bleached or Dyed. (Fast Colors.

GREENE & DANIELS MFG. CO.,

COMBED, CARDED AND GASSED

Yarns, Threads, Twines and Chain Warps,

Colored and Bleached Yarns Furnished in any manner desired by the trade. **PAWTUCKET, R.I.**

YARNS All Numbers and Qualities.

HOLLAND & WEBB,

487 Broadway, New York.

NEW ENGLAND THREAD CO.

PAWTUCKET, R. I.

Manufacturers of Spool Cotton & Supefine Tapes

Thread and Yarn on Tubes and Cones for the Hosiery trade etc. Thread dressing a specialty, for weaving purposes. Dyers and Bleachers of Threads, Yarns and Tapes.

C. MOORE & CO.,

MANUFACTURERS OF

TWINES, THREADS AND YARNS.

Jacquard Harness Twines of all kinds on hand and made to order.

S.W. COR. FIFTH & MARKET STS.,

Philadelphia.

Cohannet Mills,

TAUNTON, MASS.

Spinners of High Grade

HOSIERY YARNS OF EVERY DESCRIPTION.

Selling Agents JAMES E. MITCHELL & Co., Philadelphia and Boston.

EICHMANN & STERNBERG

530 Broadway cor. Spring St., NEW YORK.

Plain and Gassed Cotton Yarns,

HOSIERY COTTON YARNS,

Mercerized Cotton Yarns (Simile).

BURNET & CO.,

24 George Sq., Glasgow, Scotland.

All numbers and qualities of Cotton Yarns, specialities in

"Silkoline," "Ramie" and Fancies; also bleached filling on long tubes. Turkey reds, etc. A B C Code used. Telegraphic address "Tenrub, Glasgow."

COTTON WARPS

White or Colored.

Toweling and Grain Bags.

Dana Warp Mill,

WESTBROOK, MAINE.

O. H. HAYES & CO.

Will make liberal arrangements with Woolen Manufacturers to handle their productions.

O. H. HAYES & CO.

A copy of the Textile World's Directory is presented to every paip-up subscriber of the Textile World, with the compliments of the publishers.

Continued from page 133

blankets are to be contracted for and other goods. The deliveries are for immediate use and will be a good thing for spinners and weavers. To show the condition of affairs we quote a spinner, who told us that prior to January 1st they were shipping a certain manufacturer thousands of pounds of yarn, and while doing this wondered what the concern was doing with it. The concern in question now has on hand 4700 dresser spools full of yarn and a number of thousand pounds of filling yarn, all purchased on speculation. This speculation has not panned out well, as the anticipated rush has not materialized.

The Philadelphia Yarn Market.

The market on cotton yarns has been considerably unsettled the past month. We presume the war is responsible for this, in the main. Many orders have been cancelled, and many expected renewals have not been placed, although in the knitting trade, the production has been fairly well maintained. This has had its effect on yarn, of course, to some extent, particularly in the lower grades, and in cotton warps. The upholstery trade is particularly dull.

Worsted yarn mills are very dull, and carpet manufacturers are complaining of bad business. Two ply warps are coming in more plentifully than heretofore. We quote:

WARPS.

20/1	12¾ to 13
22/1	13
26/1	14 to 14½
12/2	14
14/2	14 to 14½
16/2	14½
14/1	12 to 12½
16/1	12½
20/2	15½ to 15½
30/2	18½ to 19
30/2 Eastern	19 to 19½
40/2 Eastern	25 to 26

SKEIN.

26/1	13½
20/1	13
19/1	13
4s to 10s soft	11½ to 12
12s soft	12½ to 13
20/2 medium	15
14/2	13½
30/2	18 to 19
26/2	16½ to 17
40/2	23½
8/3	11½ to 11½
10s double reeled	11½ to 12
16/3 slack	13½ to 13½
16/4 medium	13½ to 13½
16/2 slack	13½
9/4 slack	11 to 11½

SOUTHERN CONES.

6s to 8s, various qual.	12 to 12½
10s " "	12½ to 13
12s " "	13 to 14
14s " "	13½ to 14½
16s " "	14½ to 15½
20s " "	16
24s " "	16½ to 17
26s " "	16½ to 17

SHUTTLE COPS.

6s to 8s	12½
12s	12½ to 13
16s	13 to 13½
26s	13½
40s	18 to 19

(Continued on page 137.)

B. F. BOYER & CO.,
Successors to GEORGE SHIMER & BOYER,
HOSIERY YARNS,
In Wool, Merino and Worsted.
GOLF YARNS,
In Wool and Worsted. Also carry a full line
BUNDLE YARNS
For the Jobbing Trade.
516 Market St., Philadelphia.
MILLS, CAMDEN, N. J.

Walcott & Campbell Spinning Co,
IROQUOIS MILLS.
FANCY HOSIERY YARNS
IN ALL COLORS.
New York Mills, Oneida Co., N. Y.

Eddy & Street,
COTTON, WOOLEN, **YARNS** AND **BRAIDS** WORSTED, SPUN SILK.
PROVIDENCE, R. I.

HOWLAND CROFT, SONS & CO.

LINDEN WORSTED MILLS.

Fine Worsted Yarns

OFFICE AND MILLS:
Broadway and Jefferson Avenue,
CAMDEN, NEW JERSEY.

ALLEGHENY WORSTED MILLS,

Thomas Wolstenholme, Sons & Co., MANFRS. OF

ALL NUMBERS SINGLE AND TWO-PLY,

Worsted YARNS,

Sell Direct,

on Cop or in Skein, for Weaving and Knitting Purposes, in White, Natural & Fancy Mixes.
Office and Mills: Frankford Ave. and Westmoreland St., Phila., Pa.

CRANSTON WORSTED MILLS.

Worsted and Mohair Yarns—white or colors, in skeins, on spools, cones, or shuttle bobbins.

NOVELTY YARNS—of Mohair and Worsted. We are the only manufacturers in the United States making these yarns from the raw material to finished product and making Yarns only.

CENAPPED YARNS of all kinds. Doup Yarns. Harness Yarns for Braids, etc.

BRISTOL, R. I.

George Campbell & Co.

Worsted Spinners.

Yarns, both French System and Bradford.

Knitting Yarns in all Grades and Mixes.
All Numbers to 60s.

21ST STREET AND WASHINGTON AVENUE, PHILADELPHIA.

MALCOLM MILLS CO.,

MANUFACTURERS OF

Novelty Yarns, Silk Noil Yarns, in Fast Colors AND White.

Mills, Frankford, Pa. Office, 229 CHESTNUT ST., PHILA.

(Continued from page 135.)

MIXED COLORED CONES.

6s to 8s	13¼
10s	13¼ to 14
12s	14 to 15
14s	15 to 15½
16s	16

EASTERN COPS.

12s shuttle	13 to 14
14s	14 to 14½
16s	14 to 14½
12s hosiery	14 to 14½
14s	14½
16s	15 to 15½
20s	16 to 16½
24s	17½

Eastern skein ½c. above cops.

Eastern cones ½ to 1¾c. above cops.

Egyptian, carded, 4c. to 5c. above white.

Combed yarns, 4c. to 5c. above carded.

Woolen and merino yarns extremely dull and prices very low.

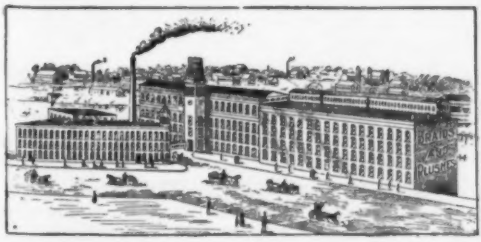
May Sales of Mill Shares.

	Lowest.	Highest.
Cornell	95	95
Union	136	136
Arlington	104¼	104⅞
Lancaster	255	255
Stark	802½	815
Naumkeag	47	47⅛
Sagamore	83	90
Chicopee	50	50
Pepperell	1100	1100
Lowell Mfg	487½	487½
Manchester	99¾	99¾
Appleton	100	100
Wamsutta	82½	82½
King Philip	95	95
Union	132½	132½
Boott	790	790
Atlantic	47¾	47¾
Amoskeag	1285	1285
Border City	100	100
Merchants	86½	86½
Shove	82	82
Seaconnet	88½	88½
Stafford	90	90

SILK NOILS AND SILK NOIL YARNS
IN WHITE AND COLORS.
MOHAIR LOOPS, KNOTS, AND FANCY YARNS FOR DRESS GOODS AND CLOAKINGS.
A. T. SKERRY & CO., 47 LEONARD ST., NEW YORK.

THE PHOENIX MILLS CO.,
MANUFACTURERS OF
Fine Worsted Yarns.
Correspondence Solicited. Samples furnished on application.
BOSTON OFFICE: 620 Atlantic Ave. Rooms 10 and 11.
MILLS: 10th & Germantown Ave., Phila. Chester, Pa.
PHILA. OFFICE. No. 13 LETITIA ST.

GEORGE SHIMER & SON,
Spinners of Worsted Yarn for the Weaving and Knitting Trade.
All kinds of Fancy Yarns for the Knitting Trade.
5th and Erie Sts., Camden, N. J.



FLYER SPUN
Mohair and Worsted
YARNS.
Mohair Plushes,
Worsted and Cotton Braids.
D. COFF & SONS, Pawtucket, R. I.
ESTABLISHED 1861.

CHENEY BROTHERS,

SILK MANUFACTURERS.

ALL KINDS OF

Knitting Silks, Ribbons AND Piece Silks,

USED FOR TRIMMING KNIT GOODS.

TRAMS, ORGANZINES and SPUN SILKS, in the Hank, or on Spools or Cones, for Manufacturers' Use. Silk for Special Purposes Made to Order.

MILLS: South Manchester and Hartford, Conn.

SALESROOMS: 477, 479 and 481 Broome Street, NEW YORK.
79 Chauncy Street, BOSTON.
186 Franklin Street, CHICAGO.

WILLIAM RYLE & CO.,

DEALERS IN

Domestic Thrown Silk of every description. Fine Pure Dye Silks for the woolen trade a specialty. Foreign and domestic

SPUN SILK YARNS AND NOILS

Importers of European and Asiatic Raw Silk.

54 Howard St., cor. Mercer St., - NEW YORK.

C. J. LITTLEWOOD & SONS, Ltd.

ALBION

DYE and BLEACH WORKS,

MANAYUNK, PA.

DYERS of Cotton, Cotton Yarns, Wool and Raw Stock Generally. **BLEACHERS** of Cotton and Cotton Yarn.

CITY OFFICE: 132 Chestnut Street. Telephone Connection,

PHILADELPHIA. MAIN OFFICE AT THE WORKS.

[PATENT APPLIED FOR]

IRONPHALT ROOFING

Guaranteed for 6 years when applied as per our specifications.

Is the most permanent covering for all kind of buildings, Ready for application. Write for samples and compare with other roofings.

Catalogue Free.

SPECIALTIES: 2 and 3 Ply Roofing, Insulating, Building and Sheathing Papers, Asphaltum, Pitch, Roof Paints, etc.

ARMITAGE MFG. CO., **Richmond, Va.**

PROVIDENCE DYE WORKS.

Dyers and Finishers,

COTTON YARNS, Suited for HOSIERY and WEAVING Cotton, Woolen and Worsted DRESS GOODS, Woolen and Worsted Mixed CASSIMERES and CLOAKINGS, also Woolen and Worsted Slubbing, COTTON YARN and WARP DYERS and BLEACHERS.

FIRTH & FOSTER CO.,

OFFICES: **Philadelphia, 546 Bourse Building.**
New York Office, Silk Exchange, Broadway and Broome St.
WORKS: **Taylor, Emerald and Adams St., Kensington, Philadelphia, Pa.**

Boston Finishing Works

WILLIAMSTOWN, MASS.

BLEACHERS, DYERS AND FINISHERS

Of Pure Finish Shirtings, Sheetings, Canton Flannels and Filled Good Also Silesias, Satteens, Corset Jeans, Cambrics, Sleeve Linings, Pocketings, Flanneletts, and all descriptions of Dyed Goods.

NAPPING A SPECIALTY.

Being equipped with the French and other Foreign and Domestic Napping Machines we are prepared to give any kind of Nap required, including the French Flannel Finish.

R. GREENWOOD & BAULT,

GLOBE DYE AND BLEACH WORKS,

FRANKFORD, - PHILADELPHIA.

Specialists in Cotton Warps and Skein Dyeing.

HOME BLEACH AND DYE WORKS,

PETER B. McMANUS, Proprietor.

Dyers and Bleachers of Cotton Yarns,

PAWTUCKET, R. I.

Pawtucket Dyeing & Bleaching Co.,

BLEACHERS AND DYERS OF

COTTON YARNS AND STOCKINET.

OFFICE WITH BLODGETT & ORSWELL CO., Manufacturers of Glazed Yarns,
28 BAYLEY ST., PAWTUCKET, R. I.

COCHRANE CHEMICAL CO.,

50 Kilby St., Boston, Mass.,

MANUFACTURERS OF

ACIDS, AMMONIAS, ALUMS, SODAS

And other Chemicals.

FAST COLORS

For Wool, Woolen and Cotton Yarn and Piece Goods Dyeing, and for Calico Printing

ALIZARINE RED, PASTE AND POWDER.

Alizarine Blues, Oranges, Browns, Yellows, Maroon, Gray and Black.
Cœruleine, Galleine, Mythylene Grays.
Thionine Blues, Thionine Indigo, Solid Green and
PATENT BLUES (superseding Extracts of Indigo on account of fastness and color bloom) for Wool and Silk, Benzidine and Primuline Colors, Zinc Dust, Aniline Salts and Oil.

VICTOR KOECHL & CO. 122 HUDSON ST., NEW YORK.

SOLE AGENTS FOR

FARBWERKE, formerly MEISTER, LUCIUS & BRUENING, HOECHST o | M.; A. LEONHARDT & CO., Muehlheim o | M.

BRANCH OFFICES:

Boston, Mass., 138 Milk St.; Philadelphia, Pa., 39 N. Front St.; Providence, 45 S. Main St.

New York and Boston Dyewood Company,

MANUFACTURERS OF

DYEWOOD EXTRACTS.

Sole Agents for the United States and Canada for
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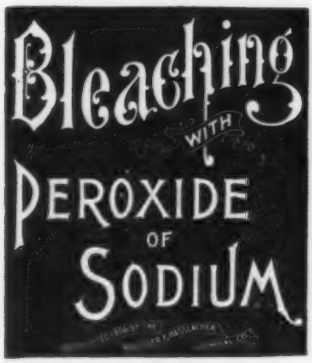

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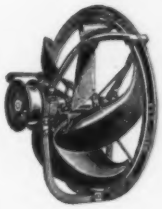

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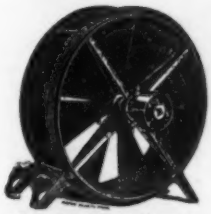

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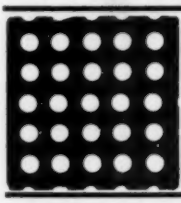

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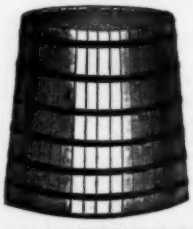

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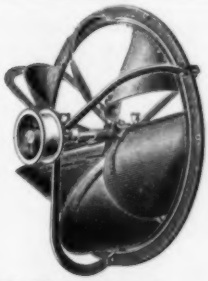

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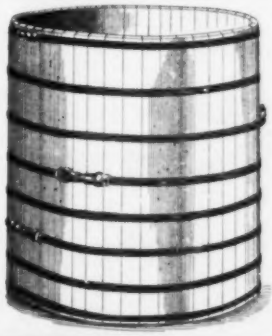

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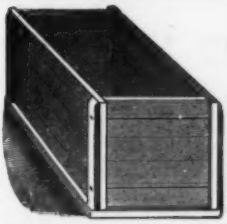

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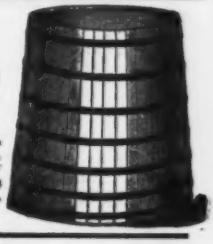

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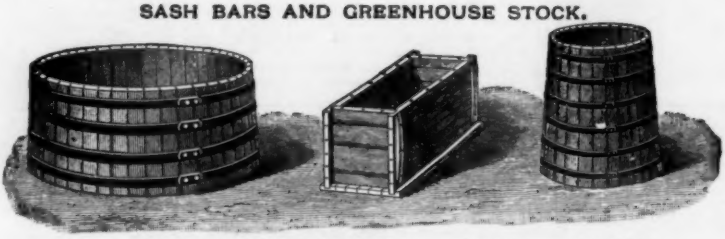

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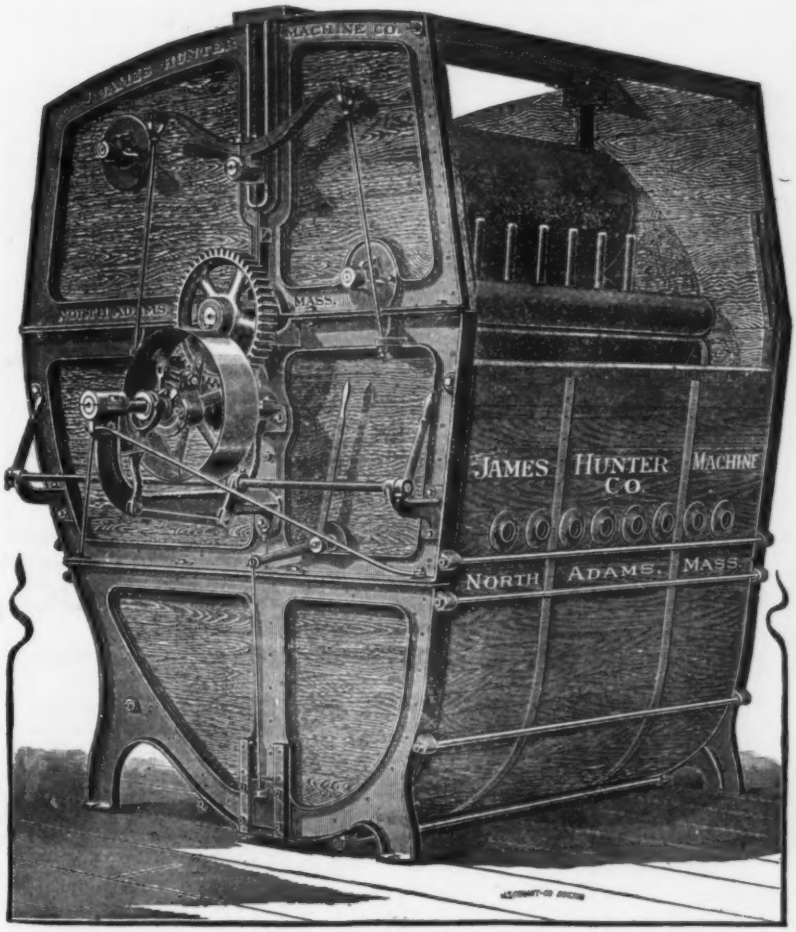

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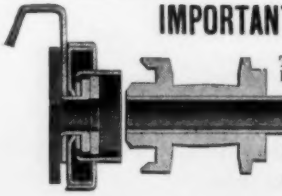

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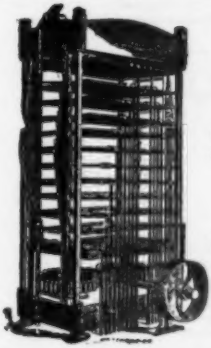

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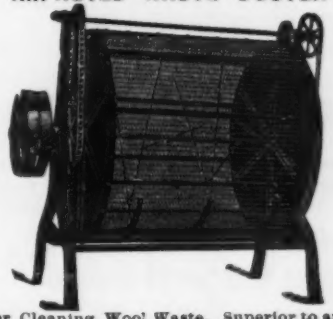

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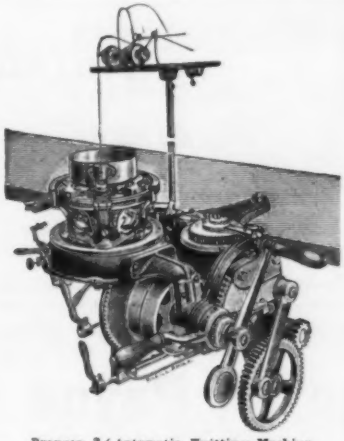
Knitting Machinery.

Hand or
Power,
Open Top or
Hold Down,
Semi or
Plain,



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Ribbers.
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Presses and
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All Sizes and All Gauges.

WINDERS and BOBBINS. HAND FORGED STEEL CYLINDERS.

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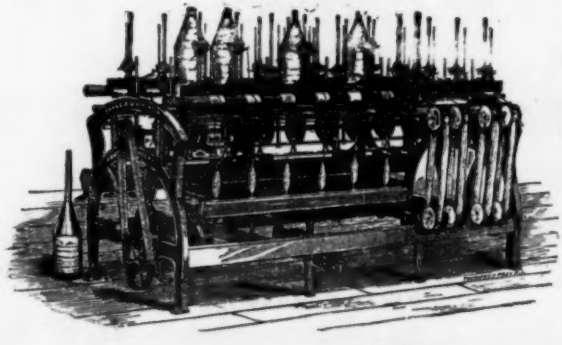

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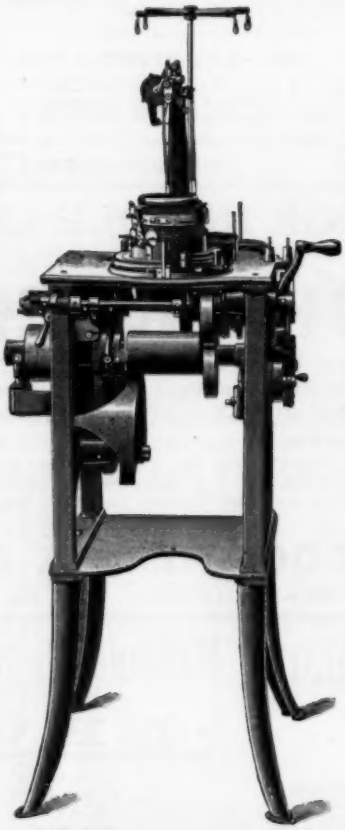

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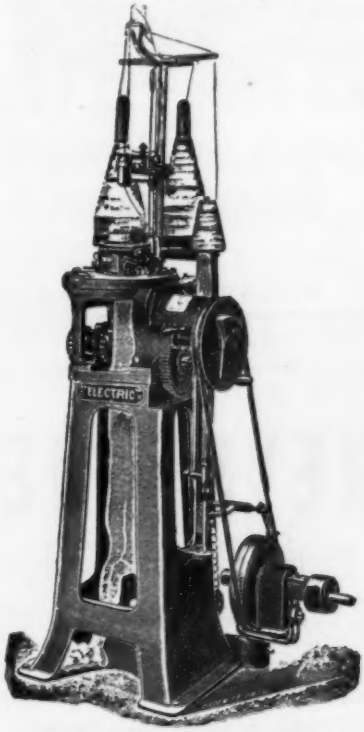

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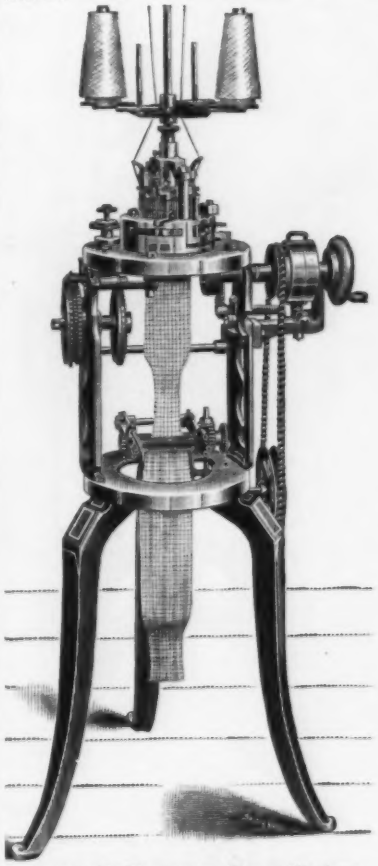

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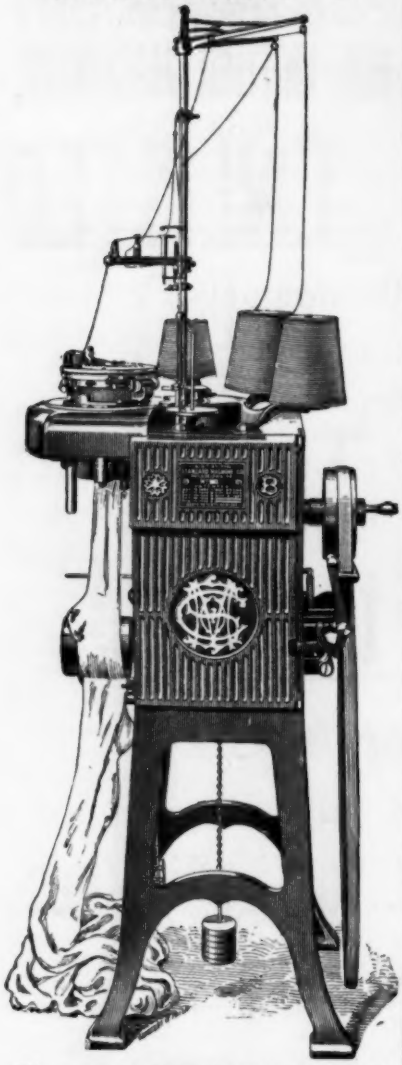

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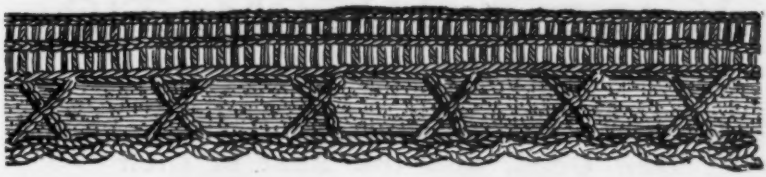

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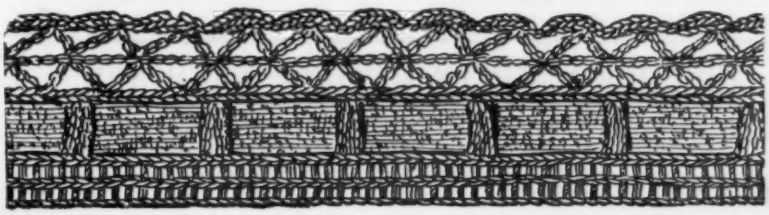

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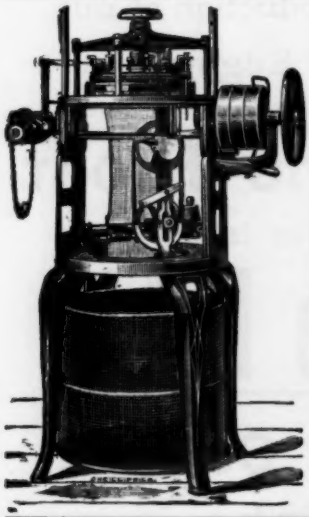

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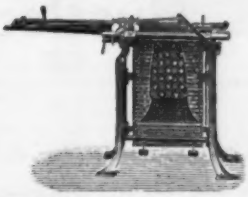

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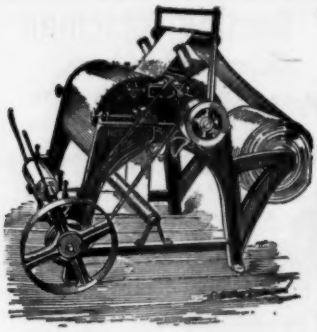

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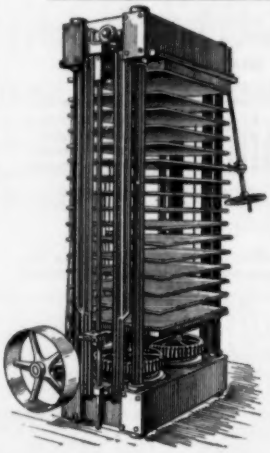

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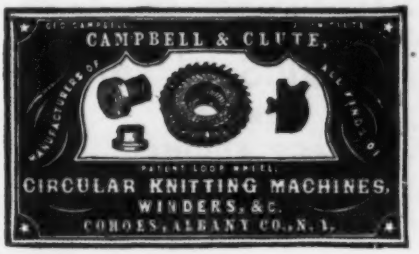

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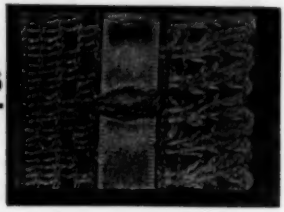

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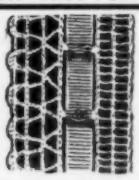

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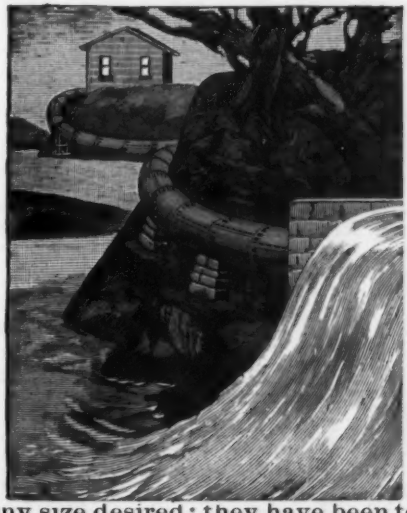

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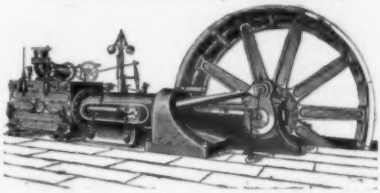

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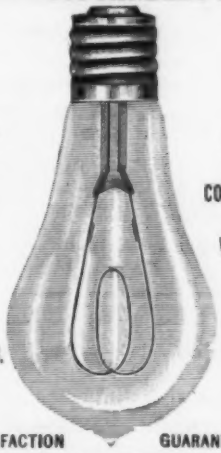

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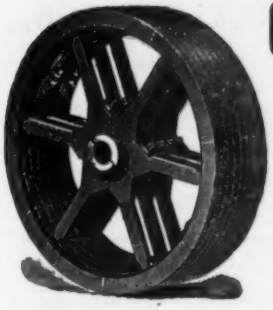

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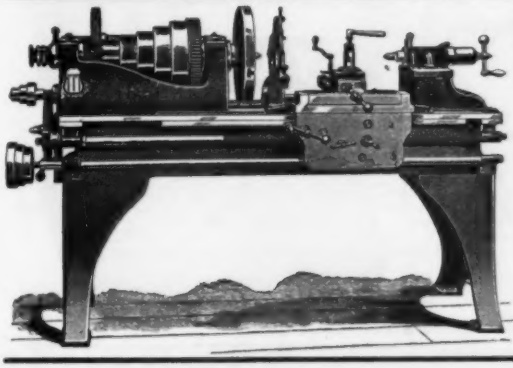

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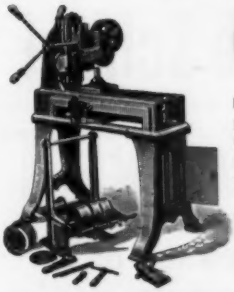

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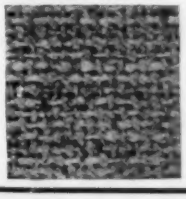

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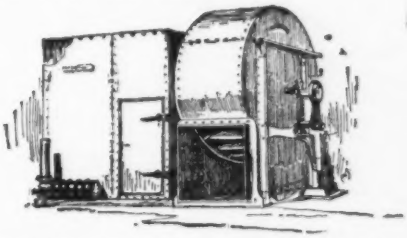

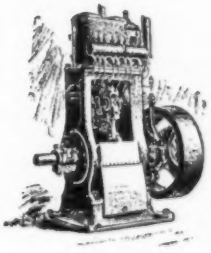

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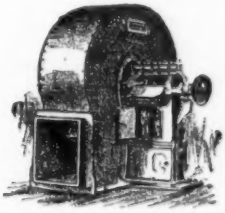

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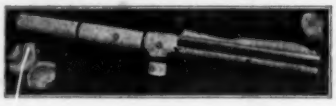
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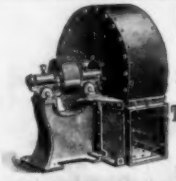
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